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MOTOR AGE

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MOTOR AGE

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DEPARTMENTS

VOL. XXII, No. 1 CHICAGO, JULY, 4, 1912 $3.00 PER YEAR

MOTOR AGE

Team Match Contest Worth Trying

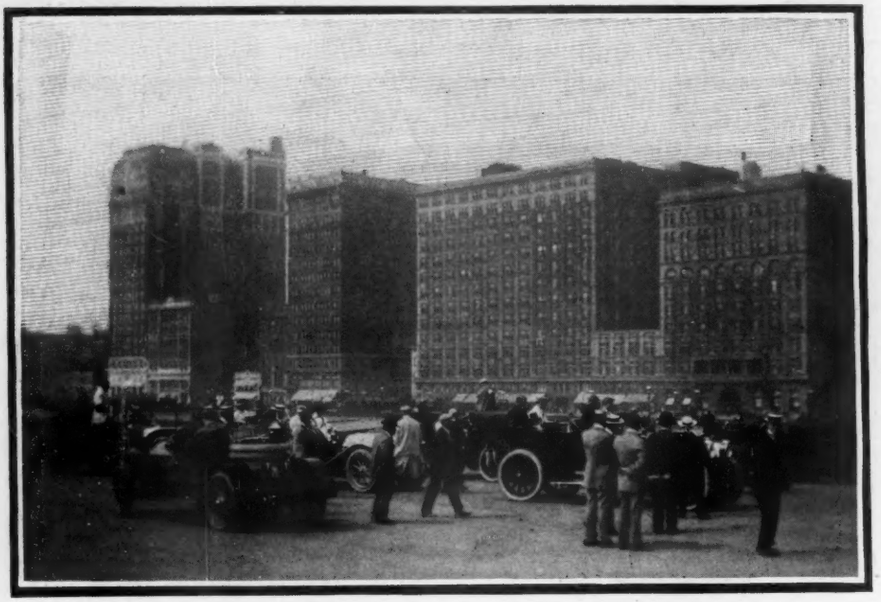
Interclub Reliability Popular in Chicago — Fifth Annnal Test Just Decided, C. A. A. Winning

By C. G. Sinsabaugh

CHICAGO, June 29—In the interclub team match Chicago has a mode of contest that is peculiarly its own but which furnishes the germ which could be inoculated in clubs in other parts of the country with great profit to the sport of motoring, in that such affairs do more to increase the interest of the owner in touring than any other form of contest run under the jurisdiction of the American Automobile Association. At least that is the opinion of Chicago motorists who have been participating in such events for the last 5 years.

This interclub proposition first was taken up by the Chicago Automobile Club and the Chicago Athletic Association in 1908 and since that time there have been eight such matches, six of which have been participated in by the two clubs originating the idea, and the other two have involved the Chicago Motor Club and the Illinois Athletic Club. In the case of the Chicago Motor Club,

INTERCLUB TROPHY AND CHICAGO TEAMS ON ROAD NEAR MUKWANOGO IN CHICAGO-MILWAUKEE MATCH



START OF C. A. A.-C. A. C. INTERCLUB TEAM MATCH FROM CHICAGO

it deviated from the original scheme a year ago when it carded a match for its own members, dividing it into two teams, one made up of amateurs and the other of tradesmen, while this summer it interested the Illinois Athletic Club in a match to Starved Rock and return.

The fifth annual interclub match was held when the Chicago Athletic Association and the Chicago Automobile Club, in which only amateurs contested, took place on Thursday and Friday of this week, the route being to Milwaukee and return. It attracted twenty-three contesting cars, twelve of which carried the colors of the Athletic club, while at least a dozen other machines took part in the affair as non-contestants and official cars, making a total of 130 motorists in the party. It resulted in a remarkably close finish in which the athletic club won with a score of 46.75 points against 58 for the automobile club. This makes the fourth victory for the Cherry Circle in the five times it has run against the C. A. C. for the Interclub trophy. The sixth match was for a different emblem.

Amateurs Show Skill

The results testify strongly as to the driving ability of the amateur who participates in such matches, for of the twenty-three contestants, fifteen went through the 2-day tour with perfect scores, while the eight who were penalized drew their black marks for trifling causes. On the winning side the chief offender was S. F. Weatherly, who ran his Pathfinder into the ditch near Libertyville yesterday, which cost him 43 points as a consequence. Before he was extricated from the mire into which he had sunk up to his hub, he had killed his motor twice, and clogged his feed line so that it was necessary to use an air bottle to clean out the mud. Coupled with this were points brought about by being late at the finish because of the accident. Of his three team mates, who were penalized, Frank Wentworth was given 4 points when his lighting system was shorted with his ignition, while the other four were given 1 point each for motor stops.

INTERCLUB TEAM RESULTS

CHICAGO ATHLETIC ASSOCIATION

No.	Driver	Car	Penalty 1st day	Penalty 2nd day
1	C. T. Knisely,	Diamond T	0	0
3	Frank Wentworth,	Rambler	0	4
5	W. F. Grower,	Diamond T	1	0
7	W. C. Thorne,	Am. Traveler	0	1
11	A. H. Gunther,	Cadillac	1	0
13	C. A. Briggs,	Chalmers	0	0
15	W. Chamberlain,	Rambler	0	0
21	S. F. Weatherly,	Pathfinder	0	43
23	Harry Boulter,	Locomobile	0	0
25	W. Simpson,	Winton	0	1
27	L. Jacques,	Peerless	0	0
29	S. E. Hibben,	Packard	0	0
			2	49

Fractional penalization, 46.75 points

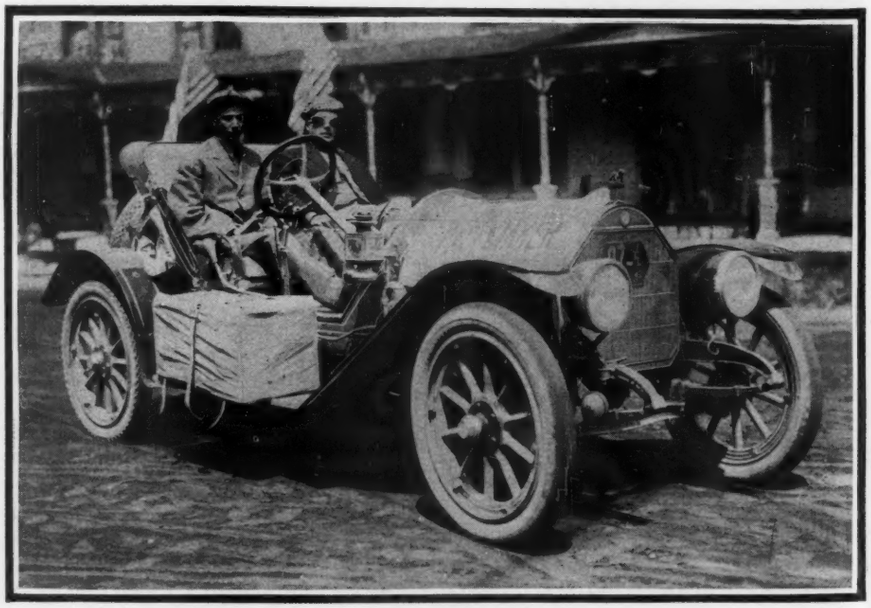
CHICAGO AUTOMOBILE CLUB

2	Allen S. Ray,	Stearns	0	0
4	G. F. Ballou,	Apperson	0	0
6	Charles Bosch,	Stearns	25	0
8	J. T. Brown,	Velie	0	0
14	R. O. Evans,	Apperson	0	0
16	H. A. Ford,	Premier	0	0
18	E. T. Franklin,	Abbott-Detroit	33	0
20	G. F. Griffin,	Peerless	0	0
22	W. M. Jones,	Winton	0	0
24	F. E. Mann,	Locomobile	0	0
28	R. B. Wilson,	Knox	0	0
			58	0

The Chicago Automobile Club finds considerable satisfaction, although defeated, in the fact that it had nine of its cars perfect and that, still more remarkable, its team went through the second day without a single point being charged against it. The two men penalized were E. T. Franklin and Charles Bosch, the former drawing a heavy penalty of 33 points for taking on gasoline outside of a control, which give him 3 points, and for being 30 minutes late at the noon control the first day. Bosch had trouble with his fan belt and was charged with 25 points. Had he know how to have used the device placed there for adjustment purposes, he doubtless could have escaped with a couple of points, but it was not until he had worked many valuable minutes that a Stearns man in another car stopped and pointed out how to adjust the fan.

Match an Enjoyable One

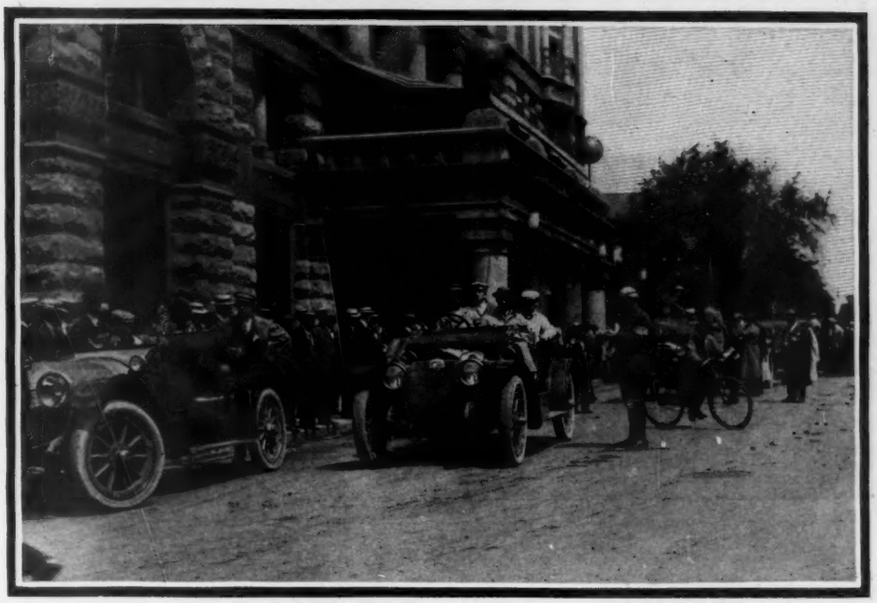
As for the match itself, the 2-day trip was a most enjoyable outing. Milwaukee is not very far from Chicago as the crow flies, but in order to get the distance John P. Dods, of the Official Blue Book, went there by a roundabout way and blazed the first day's trail over a distance of 136 miles, while he made the second day's run 120 miles. Over this route the contestants followed the schedule laid out of 18 miles for the first and last hours, because of city traffic in both Chicago and Milwaukee, and 20 miles an hour in between. The roads as a whole were fair, although there was considerable dust because of the dry spell this section has experienced the last couple of weeks. Several examples were encountered of how the roads can be improved by being oiled, while in one instance it was observed that calcium chloride was being tried as a dustlayer. Coming back yesterday the motorists were agreeably surprised to find the



REFEREE EDWARDS AND PACEMAKER LUCE IN VELIE

good roads enthusiasm that exists at Libertyville, where the highways are twice as wide as usual and dustless because of the oiling that has been done. In front of the summer home of Samuel Insull, prominent in the Chicago electrical world, there was a model strip of highway, ½ mile in length, which was as smooth as any Chicago boulevard and made of asphaltic concrete. This was the brightest spot seen on the road for 2 days of the tour.

While in Milwaukee the Chicagoans were royally entertained by the Milwaukee Automobile Club and the Badgers became so much interested in the interclub team proposition that it is almost certain that in the near future Milwaukee will undertake something of this sort. Chicagoans who were on the tour for the first time also became enthused and the result was that at the dinner given by the losing team last night Carleton White, president of the Chicago Athletic Association, which is an organization numbering 3,500 members, offered a trophy for a fall match between the two organizations, which is to be run in connection with the Allen S. Ray trophy, which already has been placed on the schedule of the two clubs for decision this fall.

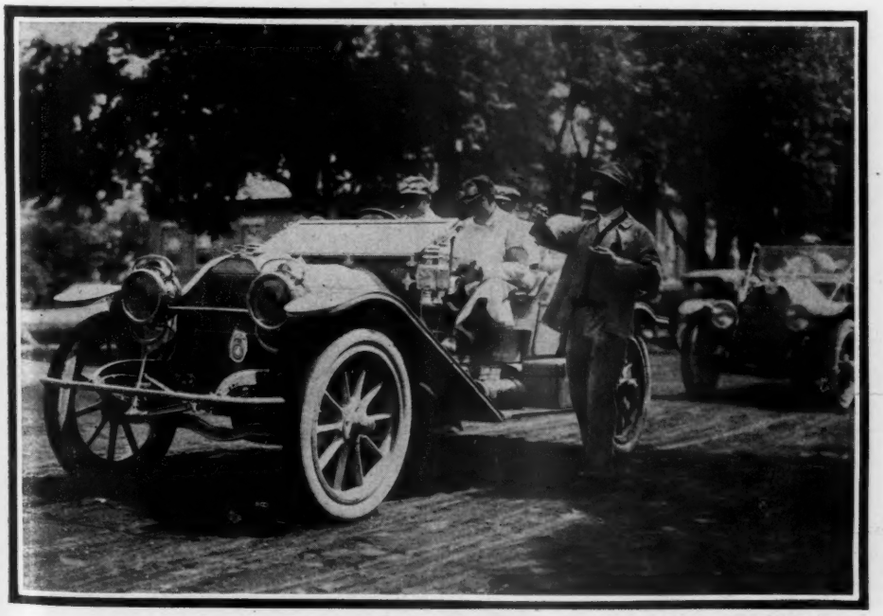


STARTER DE LONG GIVING WORD TO KNISELY, C. A. A. AT MILWAUKEE

Value of Interclub Matches

The object of Motor Age in going so deeply in this subject is not because of the news value of the match between the Chicago clubs, but to point out to motorists in general, and to clubs in particular, the benefits that can be derived from the promotion of similar contests. It seems that the manufacturers are not supporting contests so liberally as they have in the past, judging by the few events that are scheduled and the scarcity of those that are run, so something must be secured to take the place of hill-climbs and reliabilities which have been so common in the past. The interclub team match furnishes such an idea, it is thought. If confined to amateurs only it serves the purpose of arousing the interests of owners in contests primarily, and at the same time it shows them the possibilities of touring. It gets into the country men who seldom if ever drive their cars off the city boulevards, it stirs up motoring interests in the towns through which the tour passes, it calls attention of wealthy men who participate to the fact that the country roads are in need of improvement, and thus gains for the highway cause many powerful allies. It brings into competition makes of cars whose manufacturers hold aloof from the ordinary contests, and it also effectively demonstrates to the owner himself that with the modern motor car, now so staunchly constructed, trips of 250 miles are mere child's play and that mechanical troubles are no longer the bugaboo they used to be.

It was in 1908 that the idea of team matches between clubs first was conceived. The idea hardly was original because the same scheme had been tried in the Glidden tour but not with the success, however, that the clubs encountered when they tried it. The Chicagoans believed that by making it a team affair that enough club spirit could be aroused to assure success from the outset, while the friendly rivalry between the two clubs themselves would be sufficient to add a dash of ginger to the contest. So it proved. From the very outset the team match was a success and as the years have rolled by the teams have grown in size and owners who never before have been interested in contests have gone into the competition with great vim and vigor, with the result that the sport in Chicago at least is on a much sounder basis than it used to be.



CHIEF CHECKER BRANSTETTER TAKING W. F. GROWER'S CARD

Rules Are Made Easy

Necessarily rules for such a team match have to be as lenient as possible where amateurs are concerned, and the technical examinations have to be avoided because owners hardly could be expected to compete with cars that are kept in a condition that makers' entries are. Therefore, the Chicagoans started in by penalizing only for work done and for being late at controls. This is the grade 3 contests of the American Automobile Association, but Chicago adopted it before the national organization did. With this for a basis the rules have been worked up so that they apply to the team idea rather than to the individual. Because of this the regulations used in the match this week differ to a considerable extent from the A. A. A. rules. While the penalizations themselves are the same as approved by Chairman Schimpf, the Chicagoans do not penalize a contestant more than 400 points for the entire match. This is to encourage the drivers to finish, and also to prevent

SCENE ON INTERCLUB ROUTE NEAR WAUKESHA

as far as possible one man wrecking a team's chances because of mechanical trouble. The rules also specify that in case any drivers are more than 2 hours late they shall be given a penalty of 200 points and if more than 3 hours late 250 points. But, even when these demerits are tacked on the maximum penalization cannot be more than 400 points. Tire troubles are not penalized except that it is compulsory to finish within the 2-hour limit in order to avoid black marks.

Regulations Standardized

Both the Chicago Automobile Club and the Chicago Athletic Association believe that after five matches they have their rules in such shape that they may almost be considered standard and it is not at all improbable that before another summer rolls around the American Automobile Association may adopt the team regulations as standard for the entire country, no provision for team contests having been made by the national body so far. Pending such a probability and believing that possibly clubs in other cities than Chicago may wish to attempt something of this sort, Motor Age gives in brief the rules that were used in this week's match. They are as follows:

Rules Governing Contest

Course.—The fifth annual contest for the interclub trophy shall be held over a course starting from Grant park at Van Buren street, Chicago, to Milwaukee, Wis., and return, finishing in Grant park, following an itinerary a copy of which will be furnished to each entrant. The hour of start will be 9 a. m. each of the 2 days. It shall be a 2-day contest, with the night control at Milwaukee. There shall be a noon control each day—one at Lake Geneva the first day and the other at Burlington the second day. The time schedule of controls will be supplied each entrant.

Entries.—The contest shall be a team match between teams composed of members of the two organizations above named, no one of whom shall be in any way connected with the motor trade. The car must be owned by the entrant. Sons of members may drive as heretofore. The winning team shall hold until the succeeding contest the Interclub trophy, donated by the Chicago Athletic Association and Chicago Automobile Club. The losing team shall pay for a dinner to be given the winners immediately following the completition of the match.

Cars.—There shall be no restriction as to cars entered other than that they shall be fully equipped according to catalog specifications.

The contest shall be run under grade 3 of the American Automobile Association classification, which reads as follows: "A contest of any duration in which penalties are imposed for time and road work only, but in which the final operative test and preliminary and final technical examinations provided for in Rules 435, 502, 504, 505, 506 and 516 are omitted, shall be known as a contest of the third grade."

Penalizations.—The winning team shall be that team which has the fewest penalizations according to the following schedule:

TIME

One point per minute or fraction thereof, late in arrival at any control or checking station, each car being given a leeway of 3 minutes to allow for a difference in watches. In case of penalization due to work done on the car on the road, the time taken in doing the work will be added to the running time to the next control.

WORK

One point per man per minute, or fraction thereof, for labor by driver or passenger.

Two points per man per minute, or fraction thereof, for labor by workmen other than driver or passenger.

Two points per man per minute, or fraction thereof, for replacement of damaged parts by drivers or passengers.

Four points per man per minute, or fraction thereof, for replacement by workmen other than driver or passenger.

Three points per occurrence for replenishing gasoline, oil, or water, outside of fuel controls.

MOTOR STOPS

One point per minute, or fraction thereof, for motor stop when no work is done. No penalty for motor stop during period when work is being done on car, for which work or replacement a penalty is imposed. There shall be no penalty for motor stops occasioned by signals of drivers of horse-drawn vehicles, observer to be the judge.

Rule 519. Motor Stops.—Motors may be stopped at controls and while gasoline is being taken on. Other stoppages of motors between the starting and finishing of each day's run, except for tire trouble, will result in a penalty of 1 point per minute or a fraction thereof for time stopped when no work is done on car. No penalty, however, shall be charged for a motor stop during the time occupied by a replacement or work in a car for which replacement or work a penalty is imposed. Cars can check in at the night controls only on schedule time just the same as at noon. If entrants get in control ahead of time, motors must be kept running until time is up.

Motors of White steamers may be stopped for not exceeding 10 seconds in order to disengage the clutch when stopping or starting the car; also the motors of Stanley steamers must necessarily be stopped while the car is stopped. Steam cars may be stopped without penalty in order to replenish the water tank at the fuel controls. Cars cannot voluntarily leave the course.

Stopping the motor to put on tire chains will be permitted.

There shall be no penalty for tire work except in case the contestant fails to finish within 2 hours of his scheduled time at any control, when he is penalized 200 points; if more than 3 hours late, he is given 250 points for that day. Failure to finish either day's run incurs a penalty of 250 points or 500 points for both days.

Motor stops will be allowed without penalty for tire repairing, but in such an event the tire must be entirely deflated by puncture or accident, of which the observer shall be the judge.

The total maximum penalization for any car shall be 400 points for both days, except in case of withdrawal.

A penalty of 200 points will be imposed for failure to finish each day's run within 2 hours of the scheduled time or for disqualification for any cause each day 250 points for that day.

A contestant withdrawing from the match shall incur a penalty of 500 points. If a contestant is more than 3 hours late at either night control he is automatically withdrawn from the contest and is penalized 500 points.

Lubricators must not be adjusted during the match, but grease cups may be screwed down at controls. Oil, water and gasoline may be taken on at controls only.

In working on tires a driver may receive assistance from passengers without penalty.

In working on a car a driver may receive assistance from passengers, but the usual penalties will apply.

Accidents to accessories will not be penalized in case of shock absorbers, which will be charged at the rate of 2 points per man per minute taken in repairing same.

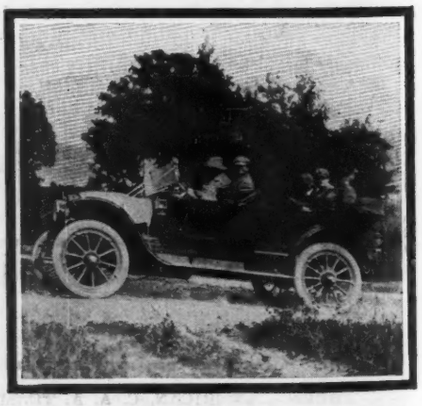
In case the contesting teams are not of equal size, the smaller team will be penalized according to the above schedule, while the larger team shall be given a fractional penalization, the numerator of which fraction shall be the number of cars in the smaller team and the denominator of which fraction shall be the cars in the larger team.

In case of illness emergency drivers may be used.

Drivers must not rely upon information ob-

H. A. FORD, PREMIER, C. A. C. TEAM

C. A. BRIGGS, CHALMERS, C. A. A. TEAM



R. O. EVANS, APPERSON, C. A. C. TEAM

tained from observers as to route to be followed or as to any question as to penalties or rules.

Each car must be checked in with the starter 30 minutes before the start each day or else be penalized 1 point per minute for each minute late in reporting after that time. This means 8:30.

No women are allowed to participate either as passengers, observers or drivers.

Observers.—The joint committee shall appoint observers, one for each car, and said observers shall occupy the seat beside the driver throughout the run. Each observer shall be provided with a blank form on which record shall be made of any occurrence which receives penalization. He shall also see that this blank form is handed to the checker at each control or checking station, in order that the time of arrival may be stamped thereon, receiving same from checker after the time has been marked. At the end of the run the observer must sign his card and hand it to the judges at the finishing point.

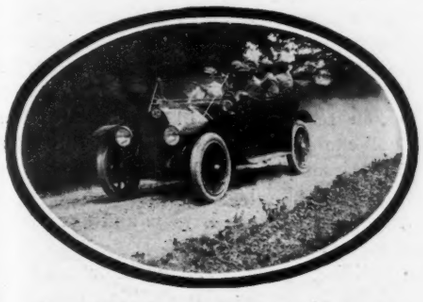
Running Regulations.—Entrants must conform to the laws and ordinances of the road and shall show due consideration to other participants in the tour and other users of the highway. Arrest for violation of the speed laws will result in a penalization of 10 points for each and every offense.

Protests.—All protests as to entries must be made to the referee before the start. All other protests must be made during the run on or before noon the next day after the contest, and must be in writing.

Regulations.—Every entrant must become acquainted with these rules and by entering agrees to abide by them. He shall hold the Chicago Athletic Association and the Chicago Automobile Club harmless and indemnify them against any losses or damage directly or indirectly growing out of the operation, management or control of the car entered by him from the time it starts in the first contest until the completion of the contest.

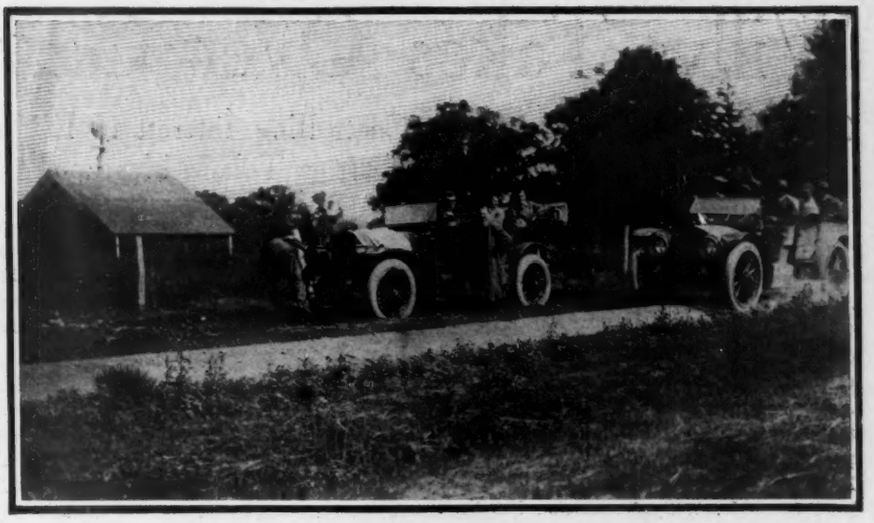
The joint committee reserves the right to alter, amend, repeal or add to these rules up to the start of the contest, as it may in its judgment deem expedient.

LEWIS CHAMBERLAIN, RAMBLER, C. A. A.



J. T. BROWN, VELIE, C. A. C. TEAM

W. C. THORNE, AMERICAN, C. A. A. TEAM



F. C. LEWIN'S CHADWICK PRESS CAR, HAS TIRE TROUBLE

Improving the Rules

Since the match to Milwaukee the joint committee representing the two clubs in the contest has been giving some thought to still more revisions of the regulations which, it is thought, would greatly improve the affair. Chief of these suggestions has to do with the perfect score cars. As it is now, there is no encouragement for those who go clean. A club could have all perfect but one and still lose. This was shown in the case of the Chicago Automobile Club which had nine of its eleven cars perfect and yet lost because of the heavy penalization of the two demerited. Therefore it is suggested that in the next match a credit of say 5 points be allowed for each perfect score recorded. This would offset to a large extent the penalties of the black sheep.

Another suggestion, and one that already has been adopted by the joint committee, is that in the next match there shall be a minimum of twenty cars to a side. More can start, and if they do fractional penalization will prevail, but each side must have at least twenty cars or be penalized a certain number of points for each car it is shy. It is felt that this will prevent so many scratches as there have been in the past. The two clubs have had no trouble in getting many to promise to drive, but when it comes time to start generally there is about one-third the cars missing. It would do no good putting on an entry fee, for this would not make the entrants keep their obligations, but it is thought that if they knew their club would be penalized in case they did not report for starting, they would be more apt to keep their promises.

One of the benefits accruing to owners in such a match is that it calls to their attention most forcibly the need of looking into the mechanical condition of their cars, and seeing that they are tuned up. Many owners are quite careless in this respect, ordinarily, and generally leave it to the garageman who sometimes is slipshod in his methods. But after going through such a contest as this the owner has it impressed upon him that there is something more to keeping up a car than filling the gasoline tank and looking after the lubrication. He finds that his car runs better if he looks after other things—looks at his springs once in awhile, examines the condition of the radiator, inspects his wiring, and a thousand other little things that all tend to keep a car tuned up. Captain Knisely of the Chicago Athletic Association team realizes that the mechanical condition of the cars has a lot to do with deciding such a match, and it always has been his custom to talk to each member of his team, advising each as to what should be done before starting in the match. This year he went even further and prepared what he calls the ten commandments which were sent to each team candidate and which contained advice that should be well heeded by owners, even if they are not going in a contest.

Contestants' Ten Commandments

The ten commandments are as follows:

1—Be sure that you have your tire chains on board and that they are in good condition.

2—Examine spark plugs and see that they are clean.

3—See that your magneto is working perfectly and that your storage battery is in good condition to run the car if necessary to switch over to battery

4—Carefully examine your electric wiring and its attachment at the terminals.

5—Better renew all oil and grease in engine, transmission and differential.

6—See that all spring clevices are tight and that spring shackles and pins are in good condition and well lubricated.

7—Flush out radiator, preferably preliminarily clean it with caustic soda and have sufficient supply of water in radiator when starting in contest.

8—Drain water traps below carbureter and gasoline tank to remove water. Also clean out strainers in gasoline line.

9—Put your best tire equipment on the wheels and see that all the spare equipment is in good condition.

10—Last but not least, see that your brakes, both service and emergency, are in proper condition.

Willys Takes Over Garford Company

Overland President Purchases Controlling Interest in Elyria Concern and Will Handle Line from Toledo Headquarters—Many Improvements in Plants Contemplated

TOLEDO, O., June 28—The finishing touch to the ambition of President John N. Wllys, of the Willys-Overland Co., was given today when the deal was consummated by which Mr. Willys purchased the common stock of the Garford Automobile Co., of Elyria, O. There is $2,000,000 worth of the stock and the product will be handled through the Toledo sales department of the Willis-Overland Co. Mr. Willys' ambition has been to make gasoline cars to suit every purchaser and he feels that this can now be accomplished with the increased facilities placed at his disposal by the latest acquisition.

The Garford plant in Elyria is capable of employing 3,000 men and the concern makes a high-priced six-cylinder passenger car and 2, 3, 4, 5 and 6-ton motor trucks. The Elyria plant will in the future be operated at its full capacity, 3000 men. Mr. Willys now controls not only the Overland business at Toledo but the Gramm Motor Truck Co., at Lima O., the Auto Parts Co., at Elmyra, N. Y., and the Garford Co. They will all become part of the proposed $15,000,000 corporation which will be organized as soon as the secretary of state authorizes the increase in capital stock application for which will be filed within a very few days.

Enormous improvements are planned for the local plant of the Willys-Overland Co., and of the Kinsey Mfg. Co., both of which concerns will be doubled in capacity. It is expected to turn out 40,000 cars from the local factory during 1913. According to a statement made by a member of the Overland Company, orders for from 2,000 to 3,000 cars have been turned down within the past 6 weeks because of inability to turn them out. Orders for several thousand cars were lost during August September and October of last year on account of inability to turn them out fast enough to supply the demand.

Among the smaller improvements to be made by the Willys-Overland Co., will be the refitting and refinishing of the drop-forging department, the old garage and other buildings. Two huge drop forges are already on the ground ready to be installed, each having a pressure of 6,000 pounds to the square inch. New modern machinery will be intalled in the new building and will be constructed along the most improved lines for factory buildings. Several new additions have been platted near the Willys-Overland Co., and nearly 1,000 new houses are being constructed to take care of the men who are expected to move to the city to take positions in the factory when the improvements contemplated have been made.

HONORS FOR SPEEDWAY BUILDERS

Indianapolis, Ind., July 1—The business interests of the city will play a pleasing tribute to Carl G. Fisher, A. C. Newby, F. H. Wheeler and James A. Allison, owners of the Indianapolis motor speedway, when they give a dinner at the German House tomorrow evening. The dinner is to be in recognition of the services of the owners of the speedway to their home city and will be one of the first honors of the kind ever paid to an Indianapolis citizen.

There are to be about 100 guests, representing the substantial business interests of the community and the banquet will be $5 a plate. There will be numerous talks extolling the services of the guests of the evening to the city.

Mr. Fisher and Mr. Allison have recently begun the construction of Speedway, the first horseless city in the world. They also are owners of the Prest-O-Lite Co. and Mr. Fisher is the Indiana agent for the Packard and Stutz. Arthur C. Newby is secretary and treasurer of the National Motor Vehicle Co., while Mr. Wheeler is a member of Wheeler & Schebler, carbureter manufacturers, and of the Langenskamp-Wheeler Brass Works.

DE LISSER REJOINS AJAX COMPANY

New York, June 29—Announcement was made yesterday that Horace De Lisser has resigned as vice-president of the United States Motor Co. to take up the chairmanship of the board of directors of the Ajax-Grieb Rubber Co., maker of Ajax tires.

Mr. De Lisser has been with the United States Motor Co. since its organization, leaving the tire business to join with Benjamin Briscoe in that enterprise. His return to tires has been made necessary by the new plans of that company that are considered of great importance to the motor car industry as indicating the advance being made in the campaign for trade for it involves the establishment of a factory in Europe for the making of Ajax tires. Mr. De Lisser will leave for Europe on the Kaiser-Wilhelm der Grosse on July 30, to be gone 6 or 8 weeks.

HAYNES COMPANY ENTERTAINS

Kokomo, Ind., July 1—Beginning last Wednesday, about 300 salesmen and agents of the company were entertained 3 days at the factory of the Haynes Automobile Co. in this city. The city was decorated for the occasion, every business house displaying Haynes pennants, while in many show windows were exhibited parts of the Haynes car of the 1913 model.

The guests were cautioned not to spend any of their own money and as a safeguard, every guest was given fifty certificates, which were accepted as money by the Kokomo business houses. A tent was erected on the factory grounds for the visitors and the city was practically turned over to them during their stay.

On Wednesday morning an exhibition of building a complete Haynes car in 1 hour 15 minutes was given. There was an address of welcome by General Manager Warren of the company. Elwood Haynes gave an interesting talk on "Recollections." Other speakers included W. J. Morgan, on "The Birth of the Automobile," and J. M. Ballinger and R. M. Anderson, who spoke on carburetion.

NEW DETROIT FACTORIES

Detroit, Mich., July 1—After a comparative lull in factory expansion locally, building operations seem to have been resumed this summer on a comparatively large scale. The largest addition of which formal announcement has yet been made is that of the Chalmers Motor Co., which has authorized and will immediately begin construction of a new factory building, adjoining its present plant. The building will be four stories in height, conforming in materials and general design to the buildings already in use by the company. The length will be 191 and the width 71 feet. In the neighborhood of 55,000 square feet of floor space will be added to the plant.

Arrangement is also being made by the Chalmers company to still further increase its facilities by the erection of another building, also four stories high, and 400 by 60 feet. This will be practically a duplicate of the two main buildings of the present plant, each of which conforms to this size. The Chalmers company has more than 30 acres of room and has ample chance of expansion.

Building operations, it is understood, soon will be begun by the Cadillac company, which has been severely cramped for room during the past two seasons, and is at present using an immense tent near its plant. No definite announcement has yet been forthcoming, however.

The Briggs-Detroiter company has authorized a large addition to its plant north of Detroit, on the line of the Grand Trunk and Michigan Central, Bay City division. This company is one of the most prosperous of the smaller local factories and has been unable to fill its orders for cars during the season, which is its first. The new addition will almost double the capacity of the plant.

Building operations also are in progress at the Studebaker, Ford and Packard plants. This, however, is a normal condi-

Change Pending in Rutenber Company

George Bowen of Syracuse Becomes Financially Interested in Western Motor Co. of Marion, Ind.—Rutenber Motor Co. Incorporated to Take Over the Business

CHICAGO, July 2—The incorporation of the Rutenber Motor Co. for $1,350,000 in Delaware last week was the forerunner of an important change in the Western Motor Co., of Marion, Ind., which long has manufactured Rutenber motors in that it marks the transfer of the business of the Western Motor Co. to the newly organized Rutenber Motor Co. and the infusion of new financial blood in the shape of George W. Bowen, of Auburn, N. Y., president of the Bowen Mfg. Co., of that city, maker of grease cups and other oiling devices.

Confirmation of this fact was secured today over the long distance telephone by Motor Age from J. W. Stephenson, general manager of the Western Motor Co. at Marion. While the deal has not been finally completed, it is as good as made, Mr. Stephenson says, and Mr. Bowen will be heavily interested from a financial standpoint. The name of the company will be changed to the Rutenber Motor Co. and Mr. Stephenson will remain as general manager and a large stockholder. With the new capital interested it is planned to double and probably triple the capacity of the engine plant at Marion.

tion, as the occasions have been rare in the history of these three companies, when expansion of some sort was not in progress.

Another firm which is adding materially to its facilities is the Poss Motor Truck Co. This is by means of a change of base, however. Up to date the Poss has been manufacturing in the old Anhut plant on Abbott street. The company has now purchased the plant formerly known as Brush runabout No. 2 at Euclid avenue and the Grand Trunk tracks, in the northern part of the city. Considerably more room is thus placed at the command of the company, which is understood to be very well backed financially and has been manufacturing on an increased scale of late.

That there are no more Buicks available for the local demand is the assertion of Clifford Starkweather, manager of the firm's local branch, who states that he has been forced to refund a large number of deposits on account of failure to make delivery on a specified date. Substantially the same condition prevails at the Ford branch, although scheduled deliveries dated some time ago are being made daily. The Studebaker corporation and the Cadillac state that the reserve supplies of their dealers are about exhausted, and both are making every effort to make a fair distribution of the present output.

Sales Manager Ernest R. Benson, of the Studebakers, says that the week just ended was by all odds the largest in the history of the company. Though all the returns are not yet in, he estimates that in the neighborhood of 2,500 E-M-F 30 and Flanders 20 cars were disposed of during the 6 days.

TUBE PLANT DESTROYED

Detroit, Mich., July 2—Fire completely destroyed the plant of the Detroit Seamless Steel Tubes Co. yesterday afternoon, doing $300,000 damage. Insurance covers three-fourths of the loss. No definite plans have yet been made, but it is given on good authority that the plant will be rebuilt on a larger and more extensive scale.

MAY LIST OVERLAND

New York, July 2—Special telegram—Application has been made by the Willys-Overland Co. to list its stock issues on the New York stock exchange and it is understood that such action will be taken. The tradeable total includes at least $15,000,000 of securities under the recently authorized increase in capitalization.

MARTIN CHOOSES INDIANAPOLIS

Indianapolis, Ind., July 1—The Martin Tractor Co. has been organized and incorporated with $150,000 capital to manufacture the Martin tractor here. Those interested are Charles H. Martin, Hugh R. Richards, F. B. Davenport, Edward D. Moon and George D. Thornton.

RECEIVER FOR ATLAS ENGINE WORKS

Indianapolis, Ind., July 1—On application of F. H. Wheeler and George M. Schebler, Fred C. Gardner has been appointed receiver for the Atlas Engine Works by Judge Clarence Weir in the superior court. The action brought on an account amounting to $2,387.50. The receiver gives $50,000 bond and will continue the business. The Atlas has the trade right in the United States to manuafcture the silent Knight engine. The company says proceedings were brought about by a temporary suspension of payments of the company's largest customer from whom $100,000 is due and also to request for an indefinite suspension of deliveries on its contract.

FORD ENJOINS DAYTON CONCERN

Cincinnati, Ohio, July 2—A temporary restraining order was issued in the United States circuit court by Judge Howard C. Hollister today against the defendants in the suit of the Ford Motor Co., of Detroit, against the Union Motor Sales Co. et al., of Dayton, Ohio, restraining them from in any manner representing or advertising that they can or have or will procure or sell to their members or customers or to any person Ford cars at less than the regular licensed prices of the Ford Motor Co. They also are enjoined from infringing in any manner whatever upon the Ford patents or confederating or conspiring with regular licensed agents of the Ford company so as to procure Ford cars.

The granting of the temporary order follows complaint made to the court by the Ford Motor Co. recently, in which it was set out that the defendants had fraudulently secured Ford cars at less than regular licensed prices and that the Ford patents had been infringed by the defendants.

L. A. Howard, of Dayton, one of the defendants named in the suit, stated today that the Union Motor Sales Co. would ask the court to set aside the temporary restraining order on the following grounds:

1—That the Ford company has no enforcible patents.

2—Even if the patent is valid the Ford company has no right of action against the Union Motor Sales Co., because it owned the cars which it sold and has the right to dispose of its personal property in any manner it desires.

3—That the contracts made by the Ford company with its licenses fixing the retail prices of Ford cars is in violation of the Sherman anti-trust law, as it tends to restrain trade and is therefore not enforcible.

This suit involves a mooted point in the relations of manufacturer and middleman.

GROSSMAN TAKES APPEAL

New York, July 1—Formal order has been issued by Judge Hand of the United States district court, allowing Emil Grossman, nominal defendant in the recent suit of J. H. Sager, involving patent rights on motor car bumper manufacture, to perfect an appeal from the decision of Judge Hough which sustained the Sager patent.

The opinion of Judge Hough was couched in doubtful terms, but the decree granted provided for a permanent injunction, and it is from that order that the Grossman party takes appeal. The case in due course will be presented before the United States circuit court of appeals. The actual defendant in the case is the United States Bumper Co. of Chicago.

ROAD LOAN HELD VALID

Baltimore, Md., July 1—The $1,500,000 road loan for Baltimore county has been declared valid by Judges Duncan and Harlan in the Circuit Court at Towson. This decision was reached in the case of Dr. William P. E. Wise, of Pikesville, against the good roads commission of Baltimore county in which the judges named dismissed the bill filed by the plaintiff.

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The Silk-Glove Car

"Winds wander and dews drip earthward; Earth whirls, sun rises and sets, and all, but to prosper a poor little violet."

THE car owner is the be-all and end-all of the motor industry; he is the personage to whom all must bow, whether engineer, factory superintendent, sales manager, branch manager, or salesman —he is the "poor little violet" for whom all work. He pays the bills, consequently all turn to him, all work to satisfy him, all labor to fulfill his desires, and more.

THESE are days in motoring when this "poor little violet" is receiving attention—attention that produces results when the owner-driver is touring or using his motor, no matter where. A glance proves it: Compare the motor car of today with one of 2 years ago—Mr. Owner-Driver has his self-starter, his electric lights, his quick-as-wink top curtains, his readily adjusted odometers, his maximum-hand speedometers, his demountable rims, his automatic windshields, his trunk racks for suitcases or special traveling trunks, his myriad-type lunch kits prolific with everything that the heart could desire, his road guide books, his sign boards, his road danger signals, his oiled roads—in a word everything except good roads in many places, and they are coming at express-rate speed.

TODAY everything is for the car owner's comfort: He can tour from season opening to season closing and have little worries as to his car. If he lives in a city where headlights are forbidden, the dash-controlled devices for lighting the acetylene headlights or the electric push buttons make it possible to turn these on when leaving the city limits or off when approaching the limits without even slackening speed or leaving the seat. His windshield is as nearly automatic as it can be—a pull backward or forward sets it in the desired position, not a wrench, pair of pliers or screwdriver being needed; not a reduction in speed is needed if the car ahead raises a dust cloud and the shield has to be put up only to be lowered a few minutes later. Should a rainstorm introduce itself the shield can be put in the rain-vision position without delay.

NOT alone in the matter of creature comforts is the owner-driver catered to, but exceptional care is taken that he be not crowded; that there be ample room to carry himself, his passengers and the luggage necessary for his comfort. This is accomplished in other ways than by the mere lengthening of wheelbase and increase of body dimensions. The former luxuries but present-day necessities are provided in such compact form that they take up but a minimum amount of space. The air for the tire, the gas for the lamps, not to mention his food and drink are supplied in bottles where they may be stowed away. Suitcases and touring trunks are designed to carry the maximum of luggage in the minimum of space; even the spare tires house tools or perhaps the feminine motorist's hats.

THERE is one factor in touring conditions today that can be improved and that is the top situation. To put up a top is a task and to lower it and fold all of the parts away another. If one person has to do the work it is particularly difficult and if a lady has to assist she is in danger of a pinched finger or perhaps a torn garment. Improvements are needed here. Already the quick-idea side curtain man has done his part and it is not any longer necessary to get all of the passengers out of the rear seat, get the mammoth cushion out of place and bring forth to daylight a medley of side and front storm curtains that have to be dusted off and laid out in order to get each into its proper place. But then the task has only begun, each has to be fitted, some finger tips almost ruined in working the curtain fasteners and perhaps by that time the drenching rain is nearly over.

IMPROVEMENTS are needed in the top field. Something practical is wanted to assist in raising and lowering the top so that one person can do the work. Some devices have been put on the market but the success of them has not been so pronounced as such devices merit, the reaso nfor which remains to be seen. The improvement role has been well launched in the quick-action side curtains and more will be done and can be done. The attaching and removing of cover slips for the top when folded is still a hard one-man job and often it calls for the muscles of two men to get the work properly done. Many improvements are needed before it will be safe for a lady to start off with the top down and hope to be able to get it up and properly adjusted before the rainstorm has drenched everybody. Improvements are needed in the tension straps from the front end of the top to the frame pieces at the side of the bonnet, as quite often these are difficult to stretch and the hasps so hard to attach or detach that assistance is needed. These matters must be improved and brought on a par with the ease of starting, controlling the lights whether electric or acetylene and doing other car works that the owner-driver must be fitted to look after.

IMPROVEMENTS are needed in jacks for elevating the wheels when making tire changes. At present the jack is a difficult device to handle, not that it possesses any defects, but owing to the inaccessible position in which it must be placed. There are cars in which it is worth the price of a new coat to get the jack properly placed and to work it. Many designers have talked about more accessible jacks, and although one or two really meritorious ones have been put on the market, they have been financial failures because the added cost made them a selling impossibility. The time will soon come when the jack bugbear will be solved and it will not be necessary to get on your knees in the dusty road or even lie on your side in the dust in order to get the jack properly placed under the rear axle in order to change a tire casing.

ONE tendency for next season, namely, cleaning the running boards of tool boxes and battery boxes, must be scrutinized so that accessibility is not sacrificed too much. When tools are taken off the running board and carried beneath the rear seat compartment it is an error. But on the other hand if they are positioned beneath the driver's seat it is a commendable change. This presupposes that the gasoline tank has been transferred from beneath the front seats to underneath the back of the chassis. For they can be removed from the space beneath the tonneau seat only by removing the cushion and raising the seat boards. Now that trunk racks are becoming so general it will be best to use a hinged door in the rear of the body. Many have avoided this because of the trouble of keeping the dust out, but there is little difficulty in solving such a problem.

Minneapolis-Winnipeg Route Blazed

MINNEAPOLIS, Minn., June 30—The Mitchell pathfinder for the fifth annual reliability tour of the Minnesota State Automobile Association from St. Paul to Winnipeg and return to Minneapolis, arrived in Minneapolis Wednesday afternoon, checking at the Radisson Hotel, the end of the run, at 4:40. The total mileage of the run this year will be 1,098.4 and the pathfinder covered 1,195 miles in 9 days' running.

The Helena tour of 1911 had a total mileage a little under 1,400 miles and there was no technical examination before or after, while the 1912 tour which is scheduled to leave St. Paul July 24 will be a second grade tour calling for two examinations of the cars. In this way this year's run will be more severe so far as the score of the cars is concerned. The milage for each day's run as contemplated at this time will be as follows:

First day—Wadena, Minn., night control, 182 miles.
Second day—Thief River Falls, night control, 166.4 miles.
Third day—Winnipeg, where the tour will stay over Sunday, 177.2 miles.
Fourth day—Grand Forks, N. D., night control, 156.1 miles.
Fifth day—Wahpeton, Minn., night control, 164.1 miles.
Sixth day—Annandale, Minn., night control, 196.6 miles.
Seventh—Half-day run to Minneapolis, 56 miles.

The northern route provided a fair measure of good roads for the tourists and there are many beauty spots in good old Minnesota that will be viewed from the cars. The White Earth reservation will be crossed and real live American Indians will be seen at close range. A noon stop is planned at Mahnomen, in the heart of the reservation. Between Warren and Hallock, Minn., a section of 24 miles of the old Pembina trail, one of the oldest known roads in this Northwest country, will be traversed. This trail was used years and years ago by the ox teams of the Hudson Bay traders.

At Northcote, Minn., the 10,000-acre farm of Walter J. Hill, son of the railway magnate, will be crossed. In fact, the tourists travel for miles with nothing but the land of this bountiful farm in view.

All during the long trip of the pathfinder it was a noticeable fact that the fields gave every sign of a bountiful harvest. Wheat, even at this early date, was in good stand, in some places being up over a foot, while barley, rye and flax were thriving. Winding trails through big patches of woods, and in some places unexpected sandy hills; pretty lakes half concealed in the deep underbrush; mile after mile of open prairie running where the road consists of two ruts for the wheels, with high grass in the center—these are some of the delights to greet the tourists' eye with an appreciation of the beautiful. Immense wheat fields will also present a charming picture, indicative of the wealth of Minnesota, the highest per capita wealth of any state in the Union.

Thief River Falls motorists will throw the town open and will receive the tourists into their homes in case the hotels are crowded. Guides were furnished from town to town and the pathfinding party made excellent progress.

Northwest's Reliability Will Last 7 Days, So Pathfinder Says

Forty-four miles out of Winnipeg the Mitchell was met by Winnipeg motorists who planned to escort them into Winnipeg. The roads after crossing the Canadian boundary were good clear in to Winnipeg. The last 8 miles into the city is being macadamized for a width of 60 feet, half being done at a time, and this extreme width is in keeping with the general plan of Winnipeg streets.

In return for their entertainment in Minneapolis 2 years ago the Winnipeg motorists will arrange an attractive program for the visitors. It is thought there will be an entry in the contesting class of nearly twenty-five cars, and at least a dozen more will join in the non-contestants' column at Red Lake Falls and Thief River Falls, while the Crookston, Minn., club is now planning to join the big tour at Dugdale, Minn., and hold its annual run to Winnipeg with thirty more cars. In this way over sixty Minnesota cars will roll into Winnipeg.

Plenty of rough roads were encountered from Grand Forks to Wahpeton. Fargo will be the noon control on that day and the tourists will cover 103 miles before they get time to eat. When the pathfinder covered the run there had been several days of boiling hot sun after a hard rain, and the road was baked into roughness for miles. If it should be wet when the tour is held, there will be provided a test for cars and drivers seldom excelled.

Wahpeton to Annandale, Minn., will give a long day's mileage with roads only fair. There are lots of hills, bad railroad crossings and bad culverts, and this day's run is really considered the supreme test of the entire journey. At Annandale there are several country hotels in the nature of summer resorts, and this night's stop will be one of the pleasantest on the entire run. A half day will be used to bring the cars the remaining 56 miles from Annandale to Minneapolis.

Coming Motor Events

*July 4—Wildwood, N. J., straightaway.
July 4—Track meet; Petersburg, Ind.
July 4-5—Track meet; Taylor Automobile Club, Taylor, Tex.
*July 4-5—Beach meet; Old Orchard Automobile Association, Old Orchard, Me.
July—Reliability run; Maine Auto Association.
*July 5-6—Road race; Montamara Festo Auto Com.; Tacoma, Wash.
*July 13—Hill climb; Forestville, N. Y.
*July 15—Reliability run; Wisconsin State Automobile Association.
July 8-13—New York motor car carnival.
*July 15-18—Cleveland News reliability run.
July 11—Automobile Board of Trade meeting; New York.
July 15-20—Reliability run; Wisconsin State Automobile Association, Milwaukee, Wis.
July 21—Track meet; St. Louis, Mo.
*July 22—Farm and ranch tour; Dallas, Texas.
July 22-27—Cadillaqua celebration at Detroit, Mich.
August 5-7—Pacific Highway convention; San Francisco, Cal.
*August 8-10—Galveston beach meet; Galveston, Tex.
*September—Commercial vehicle run; Chicago Motor Club.
September 17 — Grand Prix; Milwaukee, Wis.
September 20 — Wisconsin challenge and Pabst Trophy races; Milwaukee, Wis.
September 21—Vanderbilt road race; Milwaukee, Wis.
September 17-20—Fire engineers' convention; International Association Fire Engineers, Denver, Colo.
September—Track meet; Universal Exposition Co., St. Louis, Mo.
*Cctober 7-11—Chicago Motor Club reliability run, Chicago.
October 12—Track meet; Rockingham park, Salem, N. H.
November 6—Track meet; Shreveport Automobile Club, Shreveport, La.

SHOWS

July 10-20—Canadian Industrial Exhibit; A. C. Emmett, manager motor section; Winnipeg, Can.
September 23-Oct. 3—Rubber show, Grand Central palace, New York.
September 26-Oct. 6—Exposition agricultural motor cars, Bourges, France.
November 8-16—Olympic show; overflow November 22-30 Agricultural Hall.
December 7-22—Paris salon.
January 4-11, 1913—Cleveland show.
January 11-18—New York show.
January 11-22—Brussels, Belgium show, Centenary Palace.
January 20-25—Philadelphia show.
Jan. 27-Feb. 1—Detroit show.
February 1-8—Chicago show.
February 10-15—Minneapolis show.
February 17-22—Kansas City show.
Feb. 24-March 1—St. Louis show.
March 3-8—Pittsburgh show.
March 8-15—Boston show.
March 17-22—Buffalo show.
March 19-23—Boston truck show.
March 24-29—Indianapolis show.

*Sanctioned by A. A. A.

CONDITIONS IN TASMANIA

Washington, D. C., July 1.—Although the island of Tasmania in 1911 suffered from labor troubles, depression in the mining industry and a poor potato crop, it nevertheless made fair progress along trade and industrial lines, according to the Daily Consular and Trade Reports. The most significant gain in the import line from the United States has been in medium-priced motor cars.

American cars have taken a strong hold in Tasmania and are particularly popular with the commercial travelers, doctors, etc. A daily passenger line in competition with the government railway is now in operation between Hobart and Launceston, the two chief towns on the island, and covers a distance of 120 miles.

Society of Automobile Engineers Holds

Several Hundred Members Gather in Detroit and After Short Confab Embark on Steamer for 2-Day Trip During Which They Have Opportunity to Listen to Many Interesting Papers on Motor Topics Including Truck Engines, and Worm Gear

ENGINEERS ASSEMBLED AT FORD PLANT IN DETROIT

DETROIT, Mich., June 30—The regular annual summer meeting of the Society of Automobile Engineers was brought to a close Saturday night with the arrival at its dock in Detroit of the City of Detroit II. The session was most successful both from the standpoint of the actual society work accomplished and from a social point of view.

On the 2-day boat trip, nearly 400 members were present, and the innovation proved its value as a means of keeping the engineers together, inasmuch as there was no possibility of the sessions being meagerly attended, due to engagements elsewhere. No appointment could arise to disturb the peace of any member, nor to interfere with anyone's remaining to the end of a discussion.

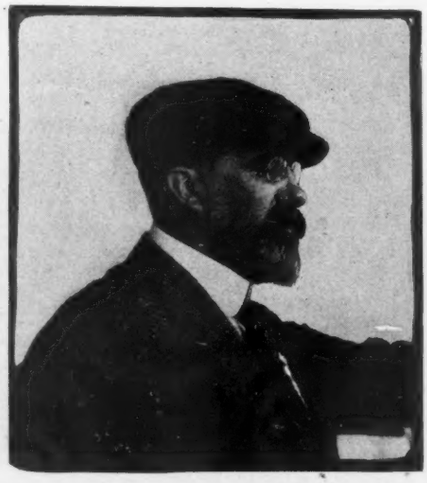
Socially, the affair left nothing to be desired. The wives and daughters of the engineers were well taken care of and amusements on board ship were provided especially for their enjoyment. While the more serious matters of the convention were being carried on in the main cabin, the women of the party made use of the deck games and the card tables, all entering into the spirit of the affair and congregating here and there in little groups, for all the world like a little community which had a common interest and which had long been together.

First Session in Detroit

Although the meeting of the standards committee at the Pontchartrain hotel in Detroit on June 26 really was the opening of the convention, the society proper did not get together in session until the following morning in the convention hall of the hotel. At this opening session, the address of the president was first given, after which all general business was disposed of. The treasurer's report, the reports of the tellers of election and the report of the broaches division were heard at this time. Lord Montagu, noted English motorist, editor and publisher, who is making an extended visit to this country, addressed the convention at this opening session. Other engagements prevented his going on the boat trip.

Engineers Visit Ford Plant

In the afternoon of this first day, the society members visited the factory of the Ford Motor Co. in a body, where they were royally taken care of in their journeyings through the many parts of the immense plant. At the direction of Henry Ford, the entire factory was open to the visiting engineers and they were free to wander about as they saw fit. They congregated here and there in little groups in the mammoth machine shop, in the assembling room, the motor testing department and the stock room. The little blue and gold convention badge was all the passport necessary to gain for the wearer permission to visit any part or to watch any operation connected with the production of the Ford car which holds a unique position in the motor field.



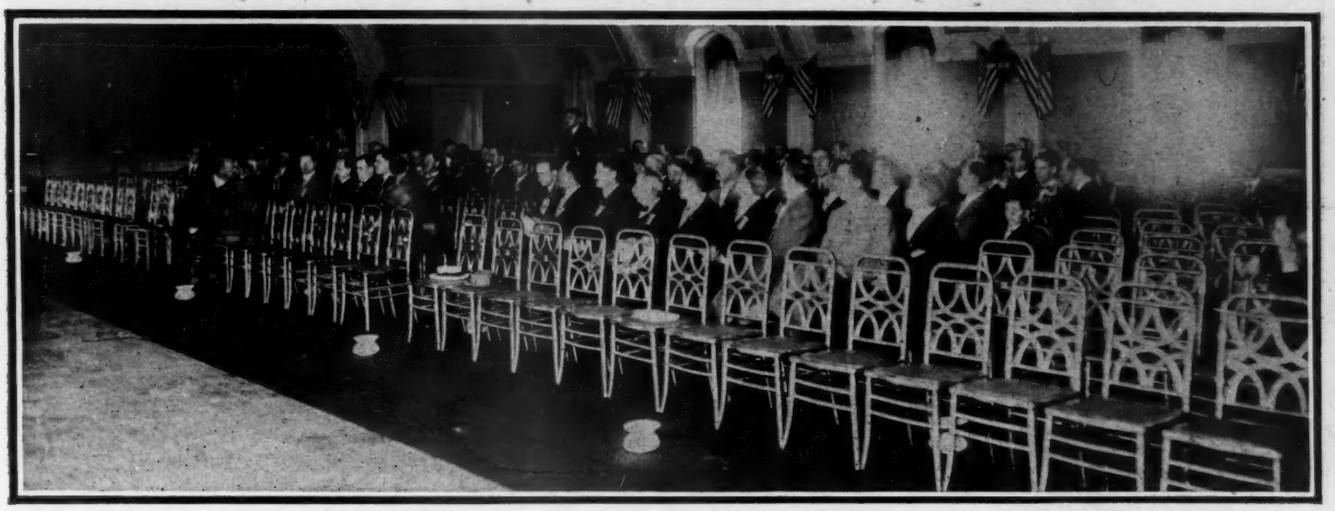
PRESIDENT H. F. DONALDSON

In the evening, the women and the members went on board the steamer, which sailed for Mackinac island at 8 p. m., Thursday. Owing to the procrastination of some of the members in not advising the committee of their intention of taking the trip until the last minute, the accommodations were not sufficient to provide for some fifty of the party. A week before, when the entertainment committee headed by Howard Coffin had engaged the boat for the trip, its capacity had been amply sufficient for the number which had at that time signified their intention of going. Had this committee known of the exact number, a larger vessel would have been provided. However, the sportsmanship and generosity of the Detroit members was exhibited in their giving up their berths to the late arrivals, and contenting themselves with sleeping in improvised bunks in the passage ways.

Such a large delegation amply demonstates the increasing activity of the members of the organization, and another year it is promised that one of the largest vessels on the lake will be procured. The attendance was far in excess of the hopes of the committee in charge.

Most Unique Annual Summer Meeting

President Donaldson Makes His Report, Showing Wonderful Growth of Organization, While Lord Montagu of England Delivers Address—Carbureter Division Makes Report —Discussions of the Various Papers Participated in by Prominent Tradesmen



MEETING OF ENGINEERS AT THE PONTCHARTRAIN, DETROIT, ON THURSDAY

The steamer arrived at Mackinac Island on Friday afternoon at 4 o'clock, where all went ashore, the ship not leaving until late in the evening. Here many of the staid engineers shook off their stately air and learned look and unbent to the extent of participating in the evening in snake dances and other festivities in the little summer resort street. Following the taking of a large group picture of the entire party immediately on arrival of the steamer, the island points of interest were visited and the old fort with its ancient block houses was seen.

The return trip was over a different course, the steamer calling at Port Huron on Saturday afternoon to permit any members who so desired to take trains for points east or west. Very few, however, abandoned the ship here and practically the entire part was again landed at Detroit in the evening of the second day.

Papers Thoroughly Discussed

Although not all of the business which was to have come up before this meeting of the society was not covered for lack of time, such matters as were considered were given the fullest discussion, President Donaldson believing that the information so imparted being of such value that it was better to have covered few of the papers and reports well than to have attempted to get over the entire program in a hurried and cursory way. This opinion was generally held by the other members. Those papers and reports which were not presented were put over until the January, 1913, meeting.

In opening the society's annual summer meeting, President Donaldson touched first upon the steadily increasing membership and the rapid growth of its influence in the motor field. He stated that the organization can view with satisfaction the technical work which it has already accomplished, and that it should use this as an incentive to greater and further effort. Along with its technical work he believes that the society can do a great work in bringing together the technical men of the motor industry upon whom its very foundations of the industry now repose. The address was:

In welcoming the members of the S. A. E. on the occasion of the semi-annual meeting of the society, your president is able to report that the affairs and activities of the society are in a very satisfactory condition. The growth in influence of the society is reflected in the steady increase in membership, which now exceeds 1,300, a gain of about 60 per cent over the total membership at the time of the 1911 midsummer meeting.

As you are aware, the membership committee has taken hold of the work vigorously and, with the active coöperation of the members, the results have been very gratifying. The work of the committee and the supervision of the council in passing upon the membership applications have been conducted in accordance with the provisions of the S. A. E. constitution.

E. P. BATZELL

Since the last meeting of the society in January, the headquarters in New York have been removed from 1451 Broadway, at Forty-first street, to the new twenty-story building, 1786 Broadway, corner of Fifty-eighth street, in the center of the metropolitan motor district. A serious effort has been made to secure suitable quarters in the Engineering Societies Building, on Thirty-ninth street, but there was no unoccupied space that could be adapted to the uses of our society.

The present quarters are close to all means of transportation on Manhattan Island and provide a practical home for the society on an economical basis. The members' room on the twelfth floor, about 30 feet square, commands a magnificent view of Central park, Columbus circle, upper Broadway and the Hudson river. This room has been comfortably furnished for the exclusive use of the members and contains files of the motor publications, writing desks, stationery, telephone, etc.

Recommends the Bulletin

During the past 3 months the regular monthly publication styled the S. A. E. Bulletin has been undertaken and will be continued regularly hereafter. This provides a convenient means for periodical communication to the members of information about the activities of the society. It is in convenient, readable form, so that it can be preserved for constant reference, and already has been found to be an effective substitute for the mimeographic sheets which now are used only when it is necessary to send out important notices between the dates of publication of the S. A. E. Bulletin.

A feature of the S. A. E. Bulletin is the listing of "Men Available" and "Positions Available" for the information of the members. This is the outward sign of an employment bureau maintained by the society for the service of which no fees are charged. The bureau has been very successful in filling vacancies for employers and finding positions for members suited to their capabilities.

In no other one direction has the society so effectively contributed to engineering progress and the good of the motor industry as in the development of the so-called standards. Of all the activities of the S. A. E., the standards work has been the most discussed—the most praised and the most abused. The society is fortunate in having for chairman of the standards committee a member who combines brawn with brain—although up to the present time his combats have been confined to intellectual encounter. An old proverb says that "The proof of the pudding is in the chewing of the string," and so while the mastication of the string has occupied the exclusive attention

TALKING IT OVER ON BOARD THE STEAMER

of some, others have already digested tue standardization plums and appear to be well fed and happy.

The angles of approach are a delightfully Euclidean study. Some even assert that the term standard is a misnomer, which assertion recalls to mind the Shakespearian reference to a rose. What is a standard? Astronomers tell us that some of the celestial bodies get askew when the notion seizes them so that even such fixed and irrevocable things as stars become unstandardized.

Coming down to earth, we have the case of monetary standards which are not really standard—witness the proposal to coin ½-cent and 3-cent pieces in America, and the abandonment of the guinea, the 3-penny and 4-penny pieces in England.

And so with the standards of weights and measures—witness the sustained effort in England to substitute metric for imperial measures.

Others suggest the practical abandonment of standards, foreseeing the impossibility of getting nation-wide acceptance. For such there is encouragement in the history of the metric system. About 40 years after its adoption by France, the government was obliged to pass laws providing severe penalties for the use of any other system of weights and measures. The S. A. E. standards have had a more speedy acceptance, even if they have been only "accepted" by the society and not "adopted," a fine distinction that gives comfort to many able minds.

Suggests "Recommended Practice"

As a result of familiarity already gained in standards work, and having in mind the long continued and highly successful standards experience of the Master Car Builders' Association, the council of this society has decided that in future the conclusions reached by standards committees will be designated "recommended practice." When such practice is confirmed by general usage, the term "standard" may be applied. To suggest standards applicable in perpetuity is to assume a lack of information and capability on the part of those who will take up the work of construction when we are only a memory.

The important work of revising and adding to the S. A. E. handbook has been entrusted to a new professional committee styled the handbook and data sheet committee. This committee has been selected with a view to the special experience of its members in such work and has now in its possession a large amount of engineering data which will be critically examined and edited for publication. As the work of this committee is one of the most important undertakings of the society—of direct benefit to a large majority of the members—the active coöperation of every member is invited. Contributions of data, whether in tabular or graphic form, or as memoranda, will be thankfully received by the committee. The data sheets already issued are of great value to motor engineers and are really an indispensable part of the designers and drafting room equipment.

Every member of this society recognizes that there are many obscure problems connected with the design and construction of motor vehicles that are still unsolved. The habit of mind which is best fitted to cope with problems of production is not the most efficient when applied to the consideration of abstractions. Much good work has been done in the service of motor car manufacturers, but there is always present, even unconsciously, the limiting effect of a salable product, which indeed is the ultimate purpose of the so-called experimental department of the car factory. Therefore it will be of much interest to the members of the industry to know that the society is now in correspondence with the United States bureau of standards, in Washington, for the purpose of reaching a basis of agreement whereby the bureau can conduct scientific investigations of problems in carburetion, ignition and the like. It is unnecessary to lay an emphasis upon the value to the industry of determinations reached by the United States bureau of standards which is preëminently the scientific authority in its field in America.

Co-operation Promised

Coöperation upon somewhat similar lines has also been promised by the laboratory of the Automobile Club of America and the laboratory of the University of Michigan, both of which are well equipped in personnel and material to assure the most valuable results.

Another gratifying development of the standards work of the society is the approval of the S. A. E. motor truck wheel standards by the National Association of Automobile Manufacturers. Also, at a recent conference between members of the S. A. E. truck standards committee and the N. A. A. M. commercial vehicle committee, an agreement was reached whereby the work of the two committees will be coördinated, the N. A. A. M. committee confining its investigations and recommendations to standards of a commercial character, and the S. A. E. committee to those of a more technical character, relating particularly to chassis construction. At this conference the cordial relations existing between the two great organizations in the motor car industry—the one commercial in character and the other technical—were strengthened and a united effort for the good of the industry agreed upon.

Your president recommends that a serious effort be made by the society to accumulate historical engineering data for preservation in our library. There are doubtless many drawings and photographs of early models now available which will have a constantly increasing historical value and which owing to their obsolete character and the usual limitations of storage space in a manufacturer's office may be destroyed. It ought to be one of the functions of this society to collect and preserve such material and the coöperation of all members is invited.

Lord Montagu Talks

Following this, Lord Montagu was called upon to address the convention. The keynote of his remarks was standardization and he brought out its advantages and disadvantages, its limits and its scope, in a masterful and most comprehensive manner. His views were all the more valuable since they gave an insight into the attitude of the English motor fraternity on this much discussed subject. He said in part:

I esteem it a great honor to say a few words, as I represent to a certain extent English motoring. I listened to your president's address with great interest, as I saw in it reasonable standardization the sams as is being aimed at today in England. But as in England so here, you will have some difficulty if you try to raise standardization too high. There are several difficulties that will arise if you try to go too far in this work: In the first place your trade is very international, as can be seen on the main roads of England and France, where you see American-built cars in great numbers, and in considering standardization and replacement of parts you must take into consideration the standardization of the industry as it is carried on in England and France.

Montagu on Standardization

Second: When people talk standardization they forget that all invention must come as a spur of dissatisfaction. Some engineer has become dissatisfied with some parts of the car and sets about to correct it; and in this great motor movement it would be a disastrous error to place a limit on inventive genius or in a word to say how the coat should be cut or how the hair should be trimmed, as it is only in certain directions that standardization must be carried on.

Standardization has many advantages to the car maker and the car buyer, but do not press it too far if you want to continue healthy rivalry and research work. Standardization pressed too far is bad.

In England and France we are all endeavoring to standardize where possible. To be specific, we might have two or three or four sizes of wheels, but standardization work would simplify the work of wheel and tire makers. You can standardize on nuts, bolts, rivets, tubes and steering wheels, but if you go into carbureters and gearsets both are today in their infancy and you would make a mistake if you limited the activities of the engineers in any way in relation to these parts.

Frequently outsiders see more than engineers in a problem of this nature, and taking a world-wide survey of this great world-wide revolution of transportation—the motor car—you are talking on something that can not come for years to come.

Take a parallel in locomotive engineering: Here not until the last few years in England and France have they got any standardization and here I see a difference as one locomotive for hauling freight from Buffalo to Cleveland must be entirely different from one needed to haul from Kansas City to California over the mountains. The different loads and road conditions call for differences in locomotives.

On behalf of the English engineers we desire to co-operate in this great work and we are glad to welcome you and your cars to our shores, as it spurs our makers to higher efforts and we appreciate your cars on our shores.

Miscellaneous business of the convention then was taken up, the treasurer's report being heard and also that in regard to the membership. The former showed that for the first 6 months of the year, there was a balance on hand which was slightly in excess of $3000. As to the membership, it was stated that there was an increase in enrollment of 206 since

W. P. KENNEDY

the first of the year, bringing the total up to an amount slightly in excess of 1300, a very commendable showing indeed. The classes of new members since the first of January 1912 are:

Regular members	83
Associate members	89
Junior members	30
Firms	4
Total	206

The total enrollment as it now stands is 60 percent. greater than it was at the time of the midsummer meeting of last year. Such a large increase only brings out forcibly the fact that motor car engineers and others in the motor car profession are fast coming to realize the importance of the society as a factor in the industry and therefore are lending it their support.

S. A. E. Boards the Steamer

After a reading of the report of the broaches division and discussion of its premises, as taken up elsewhere in this issue, the convention adjourned until the following morning on board the City of Detroit II.

The work of this summer's session of the society may be said to divide itself into four parts. The consideration of the reports of the various divisions of the standards committee and the discussion which each provoked was perhaps the most important work of the convention. The paper by E. P. Batzell on "Motor Sizes and Drive Ratios for Commercial Vehicles" was the basis for a lengthy and profitable discussion on this and related truck matters. Another division was that on motor testing, of which the paper by Herbert Chase on "A Comprehensive Motor Test" and that by H. L. Connell on "Standardization and Co-operation in Motor Testing" formed the foundation. "Worm Gearing" was the fourth general subject discussed, Frank Burgess opening the very pertinent matter with his paper on "Worm Gears."

Henry Souther, chairman of the standards committee of 100, ably outlined the work of this body at the opening session on board the steamer in a very comprehensive paper of some length. Within the last year the standards committee work has been criticised, largely through misunderstanding by those not in close touch with its work, and it was Mr. Souther's aim to clear up all doubt as to the scope and character of the proceedings of this most important committee of the society. A great variety of viewpoints have been taken by those who comment and criticize.

PLAYING SHUFFLEBOARD DURING THE VOYAGE

R. H. ROSENBERG

"There is the class which believes that a standard, in order to be worth anything at all, must not be adopted or recommended until everything is known about the subject," Mr. Souther said, in part. "In contrast, there is the class which seems to believe almost anything can be standardized and which would go to very great extremes in the matter. There is apparently a sharp division of opinion between these two groups. One believes that standardization should begin early in the history of an industry. The other believes that no standard is possible in an industry until such industry is so old that the probable changes in the proposed standard are few and far between. These views are diametrically opposite and require consideration.

Henry Souther's Ideas

"To me it seems that portions of a construction may be standardized at a given time and that other details must wait further developments. It is most desirable to have the few agreed points standardized rather than do nothing at all. The whole question of standardization is interesting to the engineering world. It is viewed with the most favor by those who have gone deepest into the subject. It is viewed unfavorably by those who do not understand what kind of a standard is aimed at. Perhaps it would be well to call all the results of the work of your committee 'Standard Information' or 'Standard Practice,' rather than 'Standards.'

"Another view of a standard apparently taken by some contemplates the fact that a standard once adopted by the S. A. E. must be used by all its members or else they shall forfeit their rights to membership or citizenship or something else not expressed. This is certainly not the case. The adoption of a standard is not compulsory; it is voluntary.

"There are many more details of a motor car that should not be standardized. To draw the line in a practical way between that which is fit material for standardization and that which is not, is the work of your standards committee and of the whole society."

Work of Sub-Committees

The status and the progress of each of the divisions of the committee were gone into by Mr. Souther. He explained why some of the sub-committees were burdened with particularly difficult matters and stated that in some cases, such as the springs division, it was almost impossible to arrive at anything which could be standardized, owing to the multiplicity of factors entering into the consideration. Also in speaking of the frame sections division he brought about the same point in saying that it is a grave question as to how much about a motor car frame is susceptible of standardization. It was shown that the personnel of each of the divisions included both manufacturers of the products under consideration as well as users of them, precluding any possibility for biased views.

In closing his paper Mr. Souther stated that if conservatively carried out there can be no question but that the work of the S. A. E. standards committee will be of the greatest value to the motor car industry. Free and open criticism and co-operation from all members is necessary at all times, however.

Before opening for discussion Mr. Souther's masterful exposition of the work of

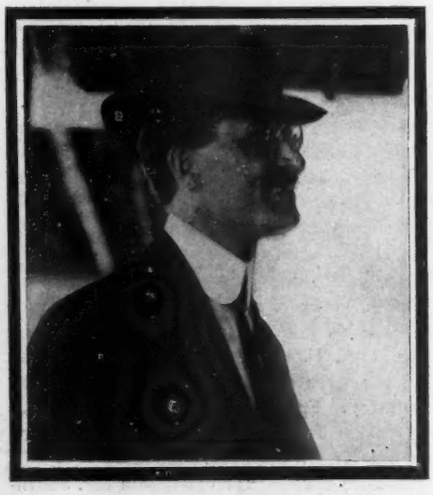
H. L. POPE AND H. W. A. BREWER

the standards committee, a letter from Henry Hess, chairman of the gear tooth shapes division, reporting the progress of his committee was read. This report was received after Mr. Souther's paper had been prepared.

Henry Hess Sends a Letter

Mr. Hess stated that a paper by Lewis before the A. S. M. E. some time ago was of special value in connection with the work of the committee. Mr. Hess held a consultation with Mr. Lewis on the subject. A number of tests have been conducted to determine the friction and wear of different gear materials. Mr. Hess stated further that there is a fund of information to be had on the subject of gear shapes, and that much work has been done in many languages. The motor industry has the highest interest in gearing, he believes. His letter added that it would require a long time for the completion of a satisfactory report by the division.

The discussion on standards was opened by C. E. Duryea, in which he voiced his appreciation of the committee's efforts and stated that it was along lines with which all are interested. He raised objection to the use of the word "tread" instead of "gauge," the latter being the correct word



J. G. PERRIN

in his opinion for the width between the centers of the wheels, whereas the former simply refers to the face width of the individual wheel.

H. W. Alden held the view that of the criticism which has been aimed at the standards committee within the last 6 months some were good and some did not amount to much. Accordingly he proposed a motion favoring the committee's work. This, however, was ruled out of order, to be taken up at the close of the discussion.

In answer to the charge which is often made that the committee's work tends to usurp the designer's field, Howard Marmon stated that there was no ground for this assertion, as its only aim was to assist.

Commends Committee's Work

C. E. Whitney expressed himself as being in full appreciation of all the work done by the committee, adding that the company with which he is connected has already saved much money by working towards the society's recommended standards.

There are anarchists and conservatives in every organization, Howard Coffin explained. Some of the suggestions for standardization are foolish, as for example, the suggesting of a standard thread for hub caps. This was rejected by the committee which believed the matter to be entirely too much of a detail. The real energies of the standards committee will be exercised along sane lines and for the common good of all concerned, he said.

H. W. A. Brewer, an English consulting engineer, was requested to give his views on the standardization matter. The one thing which most forcibly impressed him, he stated, was the live and business-like method in which the proceedings and methods of the society as a whole and the standards committee in particular were carried on. As in this country, standardization is being carried on in England, and much of the information which has been collected by the society is forming a basis for investigations there.

The largest difference which he finds is in the units of dimensions. He believes that we mix dimensions somewhat, that is, by using fractions and decimals. For example, in going over the S. A. E. data sheets he mentioned the promiscuous use of sixty-fourths of an inch in one place and thousandths of an inch in another. These should be made uniform. He referred to several illuminating passages in the reports as submitted and stated that they should all be extracted and sent around in small pamphlet form for the general good of all concerned. He added further that he was specially interested in the standardization of fittings for carbureters, since many of these instruments are imported from us and as it is now, whenever a new carbureter is installed on a car, it is necessary to alter the flange connections, the manifolding and so on. If on the products which are brought from this country, these things are made uniform on all makes, then the demand for American carbureter will increase to four time its present proportions. He remarked also upon the large number of tire sizes which are to be found in this country, stating that in England there are only four standard tire sizes. If the number in this country were brought down, it would effect economy in a number of ways. Dealers would not have to carry as large stocks for one thing.

David Fergusson had no criticism to offer on the Souther paper, but he was of the opinion that several of the matters decided upon by the divisions were at fault. For instance, he believes that the truck speed of 8½ miles for a 5-ton truck is too low, and states that the vehicle in which he is interested is designed for a speed of 13 miles an hour which he thinks most economical under all conditions. In the matter of tire sizes, he believes that some fallacy exists in S. A. E. standard sizes. In using a certain make of tire, his company is obliged to place an iron ring over the felloe to make up for the difference between the wheel diameter and that of the tire.

Merely Tentative Speeds

President Donaldson partially cleared the matter by stating that the recommended truck speeds were not society standards, but merely tentative figures as the result of straw vote by several manufacturers. The figures found their way into the data of the society by mistake.

Corroboration of this statement was made by W. P. Kennedy, who further said that the province of the committee which standardized truck wheels had nothing to do with manufacture of tires. It has fixed upon standard sizes for truck wheels and by so doing has greatly reduced the number of necessary sizes which the manufacturer must carry. Nearly all tire manufacturers are complying with these standards, but any difficulty which is experienced with the tires is not due to faults in the standards but to the persistency of the tire maker

in attempting to apply old forms of tires to new standards.

D. F. Graham of the ball and roller bearings division has found that in a general way the work of this division has benefited the bearing manufacturer and also the car manufacturer in that it is now made easier for both to get together on the matter of tolerances to be allowed and the clearances to be given inside and outside the bearings. The whole matter has been simplified, he added.

In regard to the general scope of the committee, J. G. Perrin stated that all are impressed with the possibilities and impossibilities of standardization. He believes that the changing of the nomenclature from the word "standard" to "recommended practice" will aid greatly in broadening the scope of the work. A great deal of good already has been accomplished. Standardization increases competition and gets away from monopoly, since more than one brand of any given product may be applied to a machine. Some of the points which now seem impossible of standardization will eventually lead to specific results.

Racing Cars Discussed

As an expert on racing cars, W. G. Wall was called upon to give his views. In the racing cars of his firm's make many standard parts have been incorporated, he stated. The society should and does welcome criticism and for that reason he had one suggestion to make. This was in the matter of the yoke and rod end standards, which were set 4 or 5 years ago by the A. L. A. M. and which were taken over by the S. A. E. These he believes are antiquated and should receive some consideration.

The experience of C. T. Meyers with the standards has been entirely in connection with truck work, as he stated. In all its work, his company is either using S. A. E. standards or is arranging to do so. Standardization in truck work is of the utmost importance so that branches and supply points will have all necessary parts and will reduce the time necessary for small replacements to the minimum.

H. L. Pope thinks that the work should be highly complimented and that it should be remembered that no standard is so fixed that it will not admit of change if it can be bettered thereby. He cited the example of the higher court's reversal of lower court decisions which it did not deem correct. For the most rapid advancement of the standards, each engineer should endeavor to follow them wherever possible, and if at any time he finds it impractical to do so he should advise the division concerned.

President Donaldson believed this latter remark to be very important and urged every engineer to follow the advice given. Cooperation is necessary for best results.

C. R. Watson looks at the matter from a slightly different standpoint, in that he also takes the garage man into consideration. Standardization is important for interchangeability and for stock. The garage man wants to carry as small a stock as possible and at the same time he wishes to please his customers with quick repairs. In this way the public derives the benefit. Standardization is the source of a factory's prosperity.

DAVID FERGUSSON AND E. T. BIRDSALL.

From his experience in tank making J. A. Steinmetz cited an example where the using of standard methods means a saving of $2,000 to $3,000 to one car maker. His order was for tanks which could be made with standard dies, and if this had not been the case, the extra cost would have to have been added for making special ones. On tanks standard iron pipe fittings are now used which cost in the neighborhood of 10 cents in any part of the world, whereas special fittings would amount to about $2, to say nothing of the saving in time for which the former are responsible.

L. S. Bowers stated that the wheel makers are much interested in the standards and he advocated the bringing into the fold of the resisting tire makers.

Following the discussion of the standardization subject a motion to the effect that it is the sense of the society that the work of the standards committee as outlined should progress, and that the society highly indorses its parts and principles, was carried unanimously.

Standards Committee Meets

On the day preceding the opening of the convention, the standards committee held its meeting, at which the division reports on steel, electric lighting, wheel dimensions, broaches, truck standards, frame sections, carbureter fittings, ball bearings, sheet metals, data sheets and lock washers were heard, and on motions duly seconded were referred to the society as a whole for consideration later in the week.

In all reports, progress was to be especially noted, many of the committees being so far advanced in their work that their reports were thought sufficiently good to be issued in pamphlet form. This applies to the sheet metals, broaches, carbureter fittings, springs, frame sections and ball and roller bearings divisions.

All of these are the third reports of these committees with the exception of the last named, which is a fourth report. The carbureter fittings division in particular has practically completed its work for the present, or until such time as there is need for new standards. Other committees which have particularly difficult tasks and which are collecting data on their respective subjects have thought that for a more comprehensive consideration of their work it would be better to simply report what has been done and to hold off more formal reports until the winter session. This last applies especially to the steel division.

It was reported that the recommendations of the lock washers division which were adopted at a session previous to this were favorably received by manufacturers and consumers. The large sections as laid down are somewhat heavy, but this is of small moment since they are for truck use and therefore are permissable. It has been found that most orders received by the lock washer makers from the car manufacturers now conform to the S. A. E. standards.

FRANK BURGESS

HENRY SOUTHER

J. B. Seymour stated that in the western territory of his company fully 60 per cent of the orders received were for S. A. E. sections, and he suggested that while some of the sections were heavy it would be best to let the present figures remain in force for another year so that their merits could be fully determined.

As to the electric lighting division, Alexander Churchward stated that no full report could be presented as yet, as it is rather hard to get the members to agree on the various points at present. The advent of the electric starter has brought about many complications in motor car wiring and lighting, he stated. Voltages run from 6 to 48 volts in the various systems now used, but the hope is to narrow them down to two at most within the next half year. Wiring methods also are variable, and Mr. Churchward favors the assistance of the fire underwriters to make them uniform. In his opinion, the wiring on some of the best American cars is almost criminal. While in some cases 200 to 300 volts are to be had at a short-circuit, protection against such is not often made. The wiring should be properly fitted with conduits, fuse blocks and the like.

I. J. Reuter was of the opinion that 75 per cent of the trouble is due to the wiring.

Churchward on Wiring

On the suggestion being made that the underwriters be asked to make recommendations for wiring, Mr. Churchward was authority for the statement that since the motor car voltage is low that body could not give many points of value. Their standards are on a 110-volt basis, and since the motor car lighting uses a 6-volt system, their standards would not be feasible.

W. P. Kennedy stated that he did not agree with suggestion to let the underwriters make recommendations. They have not the same viewpoint as the engineer, and for monetary reasons they run to too great factors of safety. As an illustration of this tendency, he cited the very exhaustive gasoline storage rules which were first formulated and which in many cases amounted practically to the use of a certain make of tank or apparatus. If the underwriters were allowed to make the suggestions, the motor car people would be penalized in these early stages before the insurance body is conversant with motor car lighting.

Sent to Fire Underwriters

After some discussion, a motion to present a set of recommendations for motor car wiring, insulation and so on to the National Board of Fire Underwriters with the idea of bringing the matter to a head was carried. This should help to bring about uniformity.

The lighting division has had considerable disagreement among its members as to lamp bases and sockets. A statement received from one of the large electric companies states that they are willing to standardize their product as soon as the committee has acted. The belief entertained by several of the committee that the sizes fixed upon by the division would sooner or later have to be made larger to meet the demand for stronger lights was not held by Mr. Churchward, who stated that the 16-candlepower 6-volt lamp as suggested by members of the committee will give two and one-half times the light of a ¾-inch acetylene gas burner. He therefore believes the now generally used 16-candlepower lamp to be sufficiently large, and that as soon as large lamps are used, there will be legislation against them on account of their blinding other drivers.

Mr. Kennedy stated that there was very little criticism among wheel users and manufacturers on the wheel dimensions already adopted, and he believes that it would be well to let the industry simmer down a bit on this matter before making further changes. The wheel dimensions division sent the following list of questions to the industry and almost every reply was favorable to the S. A. E. standards:

1—Is there anything impractical about them?
2—Do they require modification in any way?
3—Have they done anything to advance business?
4—Have they done anything to complicate matters?
5—Are they a saving of time or money to the wheel or truck manufacturer?
6—About what percentage of the steel bands for motor truck wheels made by you are in accordance with the S. A. E. standard dimensions?

While there are yet a few minor details of wheel dimensions to be considered, the committee's work is indorsed by manufacturers.

Mr. Kennedy also favored the branding of S. A. E. standard wheels. This would assure their being correctly proportioned and designed, although the materials and quality would not be passed upon.

The report of the broaches division which is up for the third time was read by C. W. Spicer. This report contains dimensions for broaches for square fittings, six-spline permanent fittings, six-spline sliding fittings, and taper fittings. There was no criticism adverse to the committee's report. In this, the action taken at the January meeting of the society caused the committee to consider only the six-spline, the four having been dropped until such time as there seems to be a definite demand for it from the society.

The report further recommends that the use of a taper of 1½ inches to the foot be adopted. As to threads for taper fittings, the S. A. E. standard is thought to be too coarse for broach work. It is the general opinion that for tapers having a nominal diameter from ⅝ to 1½ inches twenty threads per inch is the best size.

While the truck standards committee is not ready to present a report, progress was noted. Much research has been done and a table of truck dimensions made out on which sizes and dimensions of the various makes of trucks are entered. The N. A. A. M. truck committee, is also working on similar lines with the idea of standardization, and at a joint meeting of the S. A. E. division and the former, the work was shaped so that neither body would overlap the activities of the other. To this end the marketing phase was left to the N. A. A. M division, while the engineering questions were taken up by the S. A. E.

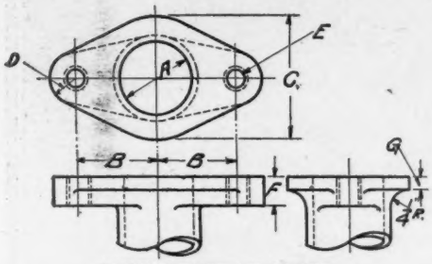
Ball Bearings Division Report

The report of the ball bearings division is merely a resubmission of certain data and tolerances to the society. There is no roller bearing data, since there are both spirally wound rollers and solid rollers and it seems impossible to arrive at any standard length which will cover all types. The length is not important so long as the bearing conforms to the outside and inside dimensions.

While the remainder of the reports of the divisions mentioned were voted to be submitted to the society as a whole for consideration, only seven of them were brought up before the convention for lack of time. These seven were those of the divisions on carbureter fittings, electric lighting, truck standards, wheel dimensions and fastenings for tires, broaches, data sheets and the magneto dimensions sub-division of the miscellaneous division.

In submitting the carbureter division's report it was brought out that the recommendations in it were submitted for final adoption, the work of the committee extending over a period of more than 3 years. In the absence of the chairman of the division, the report was read by J. J. Aull. In substance the report involves the elimination of 1⅛-inch and 1⅜-inch flange sizes. The recommendations which were adopted unanimously by the society to consider as recommended practice take into account the complete flange dimensions, the carbureter float chamber pipe sizes, the flared tube unions, the flared tube ells

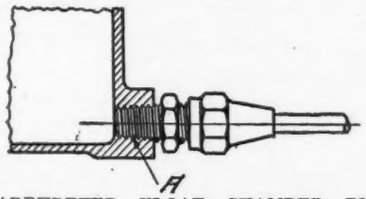
and tees and the throttle lever dimensions. Two sizes of rod ends were adopted, one a 3-16-inch end for carbureters from ¾-inch to 1-inch and the other a ¼-inch end for those up to 2 inches. The dimensions as now in\force are here given in part:



CARBURETER FLANGES

Carbureter Size inch	A inch	B inch
¾	1 1/8	1 1/32
⅞	1 1/16	1 1/8
1	1 1/16	1 1/32
1¼	1 1/16	1 11/32
1½	1 1/16	1 15/32
1¾	1 1/16	1 21/32
2	2 1/16	1 25/32

C inch	D inch	E inch	F inch	G inch
1 5/8	11/32	1/8x18 U. S. S.	3/8	1/8
1¾	11/32	1/8x18 U. S. S.	3/8	1/8
1⅞	11/32	1/8x18 U. S. S.	13/32	5/32
2 1/16	13/32	5/32x16 U. S. S.	15/32	3/16
2 1/16	13/32	5/32x14 U. S. S.	15/32	3/16
2 1/16	15/32	1/8x14 U. S. S.	1/2	7/32
3 1/8	15/32	1/8x14 U. S. S.	1/2	7/32

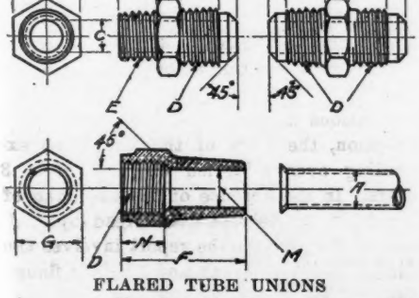


CARBURETER FLOAT CHAMBER PIPE SIZES

Carbureter Size inch	A Briggs Standard inch
¾	⅛ pipe thread
⅞	⅛ pipe thread
1	⅛ pipe thread
1¼	¼ pipe thread
1½	¼ pipe thread
1¾	¼ pipe thread
2	¼ pipe thread

A inch	C inch
¼	1/4
5/16	7/32
3/8	9/32
⅞	5/16
1/2	11/32
½	13/32

D inch	E inch	F inch	G inch
1/4x20 S. A. E.	⅛ pipe thread	11/16	1/4
5/16x20 S. A. E.	⅛ pipe thread	1 1/16	5/16
3/8x18 S. A. E.	¼ pipe thread	1 1/16	3/4
7/16x16 S. A. E.	¼ pipe thread	1 1/16	7/16
¾x16 S. A. E.	⅜ pipe thread	1 1/16	1/8

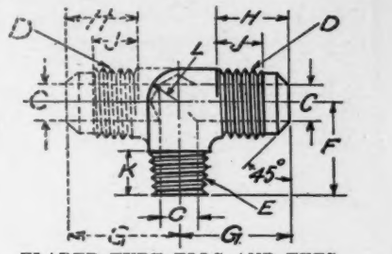


FLARED TUBE UNIONS

A inch	H inch	J inch	K inch	L inch	M inch	N inch
¼	½	11/32	3/8	1/16	.225-.257	11/32
5/16	1/2	3/8	3/8	7/32	.317-.319	3/8
3/8	5/8	13/32	1/2	1/4	.380-.382	1/2
7/16	11/16	1/2	1/2	9/32	.442-.444	1/2
½	¾	1/2	1/2	1/16	.505-.507	1/2

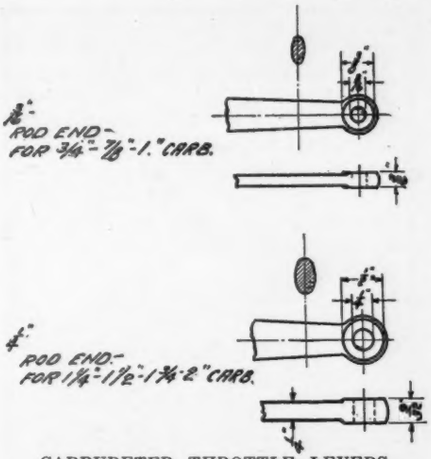
A=Diameter of Tube

A Diameter of tube inch	C Diameter of drill inch	D inch	E Briggs Standard inch
¼	1/4	1/4x20 S. A. E.	⅛ pipe thread
5/16	7/32	1/4x20 S. A. E.	¼ pipe thread
3/8	9/32	5/16x18 S. A. E.	¼ pipe thread
7/16	5/16	1/4x16 S. A. E.	¼ pipe thread
½	13/32	3/4x16 S. A. E.	⅜ pipe thread



FLARED TUBE ELLS AND TEES

A inch	F inch	G inch	H inch	J inch	K inch	L inch
¼	3/8	7/8	½	11/32	3/8	1/8
5/16	3/4	1 1/8	5/8	3/8	3/8	1/4
3/8	7/8	1	5/8	13/32	7/16	9/32
7/16	1	1 1/8	11/16	7/16	1/2	5/16
½	1	1 1/8	3/4	1/2	1/2	11/32



CARBURETER THROTTLE LEVERS

The report of the lighting division which advocated the adoption as standard practice of the Ediswan type of sockets for electric lights and the using of 4-candlepower electric sidelights and rear lights and of 20-candlepower headlights was read before the society by Mr. Souther in the absence of Mr. Churchward, and it was unanimously adopted.

Data Sheet Division Report

The data sheet division stated that it had its matter well in hand, and asked that manufacturers who make sheets to fit the S. A. E. handbook first submit the proofs to the division before sending them out, so that they can be inspected and passed upon. It also was suggested that as little advertising be placed upon them as possible so that the work of the committee will be lessened, as this superfluous matter must usually be eliminated. Suggestions as to the accumulation of useful data from the technical press and technical schools for incorporation into S. A. E. data were made.

A report presented by F. E. Moskovics covering the minutes of a meeting of a special advisory committee of the society on magneto standardization held at the Claypool hotel in Indianapolis on May 31 was referred to the standardization committee for action such as it sees fit. This committee of magneto men was composed of F. E. Moskovics, chairman; P. A. Wiley of the Kokomo Electric Co., I. J. Reuter of the Remy Electric Co., V. Kliesrath of the Bosch Magneto Co., W. J. Hart of the Splitdorf Electrical Co. and J. O. Heinze of the Heinze Electric Co.

CHARLES E. DURYEA

A standard taper for four and six-cylinder magnetos was recommended by this committee, its length to be .5905 inches, the large diameter of shaft to be .5905 inches, the small diameter .472 inches and the angle of the taper 5 degrees and 45 minutes. The length of thread for the end of the shaft was recommended to be .5905 inches, while the thread should be ⅜, 16-thread, U. S. F. As to base height the committee recommended a dimension of 1.771 inch from the center of the shaft to the base. This figure is equivalent to 45 milimeters. Other recommendations were that for the two-magneto machines the distance from the first bolt hole to the large end of the shaft taper should be 2.086 inches; the size of the hole on a two-magneto machine should be ⅜, 16 threads, U. S. F., 1,9685 inches or 50 millimeters a sheer clearance of 8 inches from the base to the top of magneto space, a width of 5 inches and an overall length of 10 inches should be allowed by motor designers; advance lever should have a radius of 2⅛ inches from the center of the armature shaft; and that this hole should be drilled to take a tapping hole of ¼, 28 p. thread.

Motor Truck Sizes and Drive Ratios

The paper by E. P. Batzell on the subject of "Motor Sizes and Drive Ratios for Commercial Vehicles," which was read by its author, was agreed to be one of the most comprehensive and valuable matters submitted at the session. The discussion which it called forth was also very interesting and instructive, some of the best informed members joining in the talk. The subject is a live one, and one with

which more than one of the members is well informed. The subject of Mr. Batzell's paper is given in part as follows:

The question of the selection of motor sizes for commercial vehicles has not been discussed much or often. It may be discussed as to several different basic conditions. In this paper it will be taken up principally from the standpoint of general economy, this being presumably most vital in successful commercial car service. Under "general economy" there are not only economy in consumption of fuel and oil, but also economy in the initial cost of the motor and its whole upkeep expense. At first the consumption of fuel only will be investigated, as to its variation according to different motor sizes for the same work. By assuming equal working conditions whenever comparison is being drawn, one need not keep track of the total fuel consumption in every case, but of merely the consumption per developed unit of work.

The abnormally great variation of present truck motor sizes is obvious. Taking the motor sizes of trucks of equal hauling capacity, as shown this year at the principal motor shows, one will find in the case of 1-ton trucks the piston displacement varying from 144 to 350 cubic inches, and in the case of 3-ton trucks from 230 to 570 cubic inches. Figuring the above volumes at an equal piston speed of about 800 feet per minute, the respective variations become: total piston displacement per minute of 1-ton truck motors from 100 to 178 cubic feet, and of 3-ton truck motors, from 135 to 264 cubic feet. Taking into consideration the difference of the weight of the vehicles proper together with their rated load, the picton displacement per pound of this weight in the case of the 1-ton truck varies from 40 up to 61 cubic inches and in the case of the 3-ton truck from 21 to 38 cubic inches per minute.

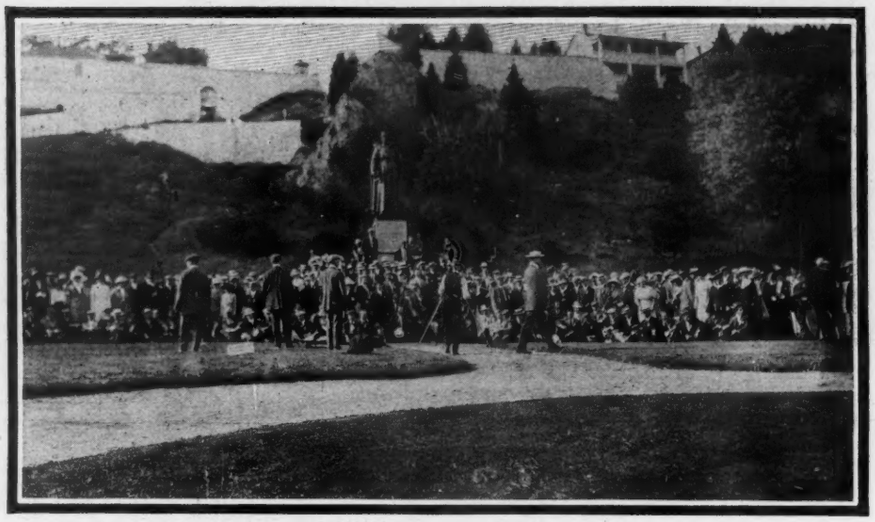
Power Depends on Charge

The power developed per unit of piston displacement depends on the charge taken into the cylinder, the compression ratio, the heat losses, the carburetion and gas mixture consistency, ignition, timing and a few other things. The present discussion refers only to common four-cycle engines. The compression space in truck motors is frequently 28 to 30 per cent of the total cylinder volume, as against 20 to 23 per cent and sometimes less in pleasure cars. Inasmuch as high compression motors develop at medium speed relatively more power than low compression motors, the difference in truck motor sizes can be explained in part by the difference of compression used. A variation of motor size within 5 to 10 per cent of the piston displacement can be thus explained.

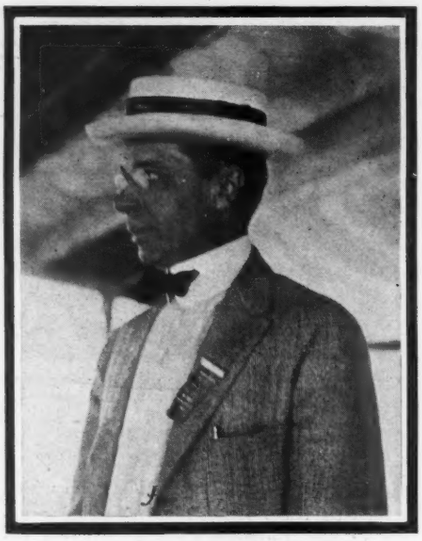
In certain cases it happens that a manufacturer uses a pleasure car type motor for trucks, either because the same motor is used also in his pleasure cars or because he is able to secure the motors on otherwise profitable terms. Putting pleasure car motors into trucks explains further why truck motor sizes vary so much. A comparatively small pleasure car engine is apt to have enough power for commercial car purposes in certain cases where otherwise a larger motor would be advisable; the high compression of the former assisting somewhat in power development. Such an engine if kept working at comparatively slow piston speed may hold out well and also prove sufficiently economical in fuel consumption, because it has a higher thermal efficiency than the low compression motor, providing it has a good volumetric efficiency. On the other hand, when an oversized pleasure car engine is used for a truck of comparatively small carrying capacity, the engine will have an abundance of power for even any extreme case of requirement during service, but most of the time it will be developing only a small part of its power capacity. Consequently this engine will work with very little cylinder filling by fresh charge, with small throttle opening, and the thermal efficiency will be low, as well as the mechanical efficiency, because the amount of power lost in the mechanism of the engine proper will be large as compared with the amount of power generated by the motor. Moreover, the initial cost of oversize motors is considerable, and they weigh more and take more space than motors of rational size and power for a given purpose.

It has been already stated that relatively high compression raises the thermal efficiency. On the other hand, it means higher pressures throughout the moving parts of the engine, and consequently the losses due to friction in them become greater also. Moreover, at slow speed the heat losses through the cylinder wall, especially through that surrounding the combustion chamber, are greater with high engine compression than with low, notwithstanding the larger area exposed to cooling in the latter. In some instances these losses may more than offset the gain in the thermal elapsing of the engine cycle. At any rate, they limit the compression ratio, which is economical for commercial car purposes.

The volume of cylinder filling by fresh charge during one cycle period is closely interconnected with the engine's pressure diagram, it being supposed that the engine has reached the stationary state of its thermal balance, viz., its cycle heat exchange. The cylinder filling is likewise interconnected with the developed motor power and torque, the latter being equal to the mean diagram pressure, times the piston area, times the crank radius, times the mechanical efficiency of the motor. In most well-proportioned automobile motors the maximum torque is developed at very slow speed, the slowest at which the motor will run under full load.



BEFORE MARQUETTE MONUMENT AT MACKINAC



HOWARD MARMON

Carbureter Conditions

When considering the cylinder filling purely theoretically, as the result of filling a compartment under influence of a pressure difference created by the suction action of a piston, the greatest volumetric filling corresponds to the lowest recorded motor speed. However, if a true reproduction of the motor performance is desired, certain practical points which might alter the former theoretical result must be introduced. One must separate the meaning of actual volumetric cylinder filling, which refers only to volume, from the "best" cylinder filling, as mentioned in this article. The second meaning is intended to denote not only the volume of gas freshly taken into a cylinder during the inlet period, but also this volume adjusted according to the state of the air and gasoline mixture in regard to the capacity of power development by this latter. Although the greatest measurable volume of air and gas would be drawn into a cylinder at the lowest speed, the conditions of the air, of the gasoline, of the carbureter adjustments, etc., may be such that the most effective mixture consistency, considered from the point of power development per unit of volume, would appear at a somewhat higher revolution per minute.

Within practical limits the coefficient of friction generally decreases as the motor runs faster. Another item to be included in the mechanical motor losses is represented by the power required for driving the air fan, the oil and water pumps, the magneto, etc., which always increases with the motor speed. Whether the resulting percentage of total mechanical losses in a motor will increase, remain constant or decrease with the gain of speed depends on the relation between the above-named kinds of power losses. Were it possible for a motor to retain a constant pressure diagram area through a range of speeds, the respective torque curve would gradually drop or rise according to whether the mechanical efficiency dropped or rose.

Thermal Efficiency

Some conditions affecting the thermal efficiency and the respective maximum do not remain unchanged throughout the whole service. Thus deposits of carbon inside the cylinder render its cooling more difficult, reducing the heat conductivity of the walls. Such a state of the motor transforms its action into one similar to that in constructions with small cooling surfaces. Therefore the maximum of its thermal efficiency corresponds to lower revolutions per minute. The same result will be detected in motors of which the exhaust passages, exhaust pipe and muffler have become clogged with sediment of the escaping gases. This will naturally cause a higher back pressure during the exhaust stroke, which will increase the quantity of spent gases remaining in the combustion chamber, offsetting the decrease of heat losses earlier by impairing the quality of the charge. The temperature of the air, the grade of fuel, the carbureter system, conditions of the ignition, etc., may influence the thermal efficiency. Therefore the foregoing discussion in regard to the latter, as being governed by the heat losses and the volumetric filling, remains true with different construc tions only when all items enter into the matter

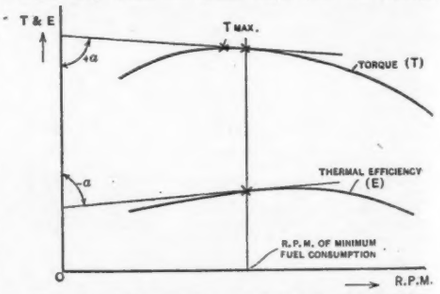


FIG. A. REFERRED TO BY MR. BATZELL

evenly. However, this should not change the statement made before, that most often the maximum of the thermal efficiency will be located at considerably higher revolutions per minute than the maximum of the motor torque. It follows that the moment of most economical motor speed with the least fuel consumption per horsepower lies somewhere between these two maxima, and where the influence of the decreasing torque development is compensated by the rising thermal efficiency. Speaking graphically, the point of minimum fuel consumption will correspond to the revolutions per minute the intersections of which ordinate with the torque and efficiency curves represent the touching points to them of such straight

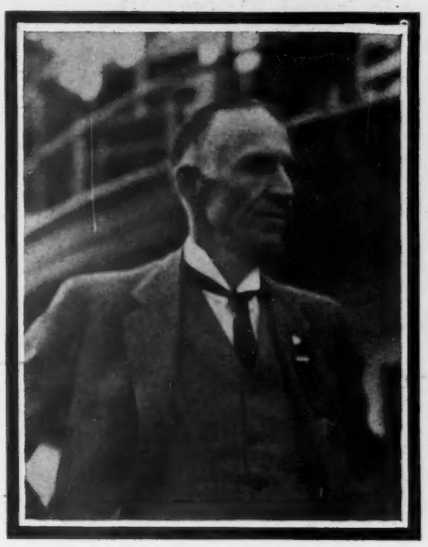
VIEW OF MACKINAC ISLAND AND THE STEAMER

lines, which both have equal angles with the coördinates, but of reversed denomination—one angle is positive when the other is negative, Fig. A. Of course, the scale units for the torque and efficiency curves must be properly selected if a graphical method of finding the minimum of fuel consumption from the above description shall give correct results.

All the foregoing in connection with the torque, the efficiency and the fuel consumption is based chiefly on logical considerations. Sometimes the results of actual tests may differ from the conclusions arrived at herein. The writer regrets that lack of available test data necessitated the employment of curves at will in some places in this article. It would be greatly appreciated to receive reliable results of actual tests by means of which one could verify some of the assumptions made. The test of the Franklin engine referred to gives one of the most complete sets of published test results, a number of which check well with the above derived statements and some of which do not. In regard to this latter fact one can say that the tests in general revealed somewhat peculiar conditions of engine action sldom met in practice.

Should other conditions involving motor economy be equal it is preferable to have the moment of least fuel consumption located on the rapidly dropping part of the torque curve. This latter must not have a rising direction at low speed, which would be particularly undesirable in case the torque maximum is close to the revolutions per minute of minimum fuel consumption. In other words, one would lose part of the advantage of less speed ratios by extending the allowable limit of economical revolutions per minute because this extension toward the low speed, when passing the moment of maximum torque, ceases to assist the increase of the factor f. The aim to increase this factor is the only reason for extending the economical speed limits on account of the consequent simplification in the speed-changing mechanism, as explained. The reduced cost of the simpler construction is to offset the somewhat larger expense for fuel.

After certain revolutions per minute are exceeded the rate of motor torque drop increases rapidly. It would seem desirable to reach the minimum of fuel consumption at higher motor speed, so as to bring it into the zone of rapidly falling torque. The relation between fuel economy and motor torque and efficiency is such that the minimum of the first can be brought into the rapidly dropping part of the second only through proper co-influence of the last. To make the fuel economy not only relatively, but actually best during the decreasing torque it is essential that the thermal efficiency increase very suddenly at this moment, so that its rate of increase will offset the influence of the diminishing torque development upon the fuel consumption. A similar sudden rise of the thermal efficiency is hardly to be anticipated in a correctly designed and built engine, because the items affecting it elapse more or less gradually without any great changes in the rate of their influence. Of course one could make use of certain means to further artificially the quickness of thermal efficiency rise during the desired time, but this could be done only at a sacrifice of the efficiency at other speeds, and moreover with a chance of lowering its absolute value generally, throughout the whole range of motor speed. It would obviously make the conditions of fuel economy worse instead of better. Therefore, it is preferable to maintain such a motor construction as will permit the maximum thermal efficiency and also the best



F. H. FLOYD

fuel economy during medium high revolutions per minute, and also not prevent the attainment of their highest values obtainable in practice.

Rate of Power Development

The rapidity of the motor torque drop indicates the rate of power development; for instance, when the torque falls quickly in value, the power curve shows a sharp declination from the initial straight direction. This means that the motor receives a smaller and rapidly decreasing amount of fresh charge, and works with a lower mean effective pressure than at the lower revolutions per minute. In other words, the motor becomes more strangled in valves and gas passages, which most frequently is accompanied by reduced mechanical efficiency.

Keeping the vehicle speed in accordance with any of the above-mentioned possibilities serves as a means for settling the rate limit of throttle closing, with the use of a prescribed drive ratio.

It is doubtless most profitable to use in a commercial car the smallest motor, the developed torque of which at the most economical revolutions per minute, with a suitable ratio in the drive, is sufficient to propel the vehicle. The motor size thus can be determined from different working conditions, assuming any of the prospective load and tractive resistance as basic in the figuring. The motor should be small enough to render reliable service when the run of the empty vehicle covers good, level roads and the desired speed is obtained with the highest ratio in the drive, whereby the motor itself remains within the prescribed economical limits of speed and throttle-opening. On the other hand, this same motor must be sufficiently strong to propel the loaded vehicle under average road conditions as expected in service and maintain the speed found the most advantageous. If these conditions are the ones most frequently to be encountered, then at the same time the motor should work with throttle full-open and also within its set speed limits, although the drive ratio might be different from the one used for the empty runs, this being determined principally in accordance with the desired vehicle speed and the revolutions per minute of the motor. Any increase above a certain limit of the tractive resistance, due to changes in the load, the road, etc., will be taken care of by introducing a greater ratio in the drive, retaining the economical motor speed and torque. The greatest ratio necessary ought to be sufficient to make the vehicle negotiate at a given slow speed the worst kind of roads to be met in service upon grades and with a considerable load. As stated before, the condition to be considered in determining the lowest speed ratio in the drive and the motor power in connection therewith should include the cost of the service versus time required to perform it with the respective motors and drive ratios.

Regardless of the method followed in establishing the motor size, the smallest one would obviously be the most economical from many other points of view than that of fuel consumption. The smaller motor uses less lubricating oil, is less expensive in initial cost, its repairs are likely to be handled more easily and cheaply, it allows reduction of the vehicle size and weight (together with a number of advantages connected therewith), some of the other vehicle parts can be decreased in size, etc. The smaller and lighter motor permits either reducing the overall dimensions of the vehicle for a given carrying capacity, or leaving more available room in the same space, and greatly increases ease of arranging the whole vehicle construction, especially in the generally crowded space occupied by the power plant.

It is to be noticed that the foregoing discussion deals with the question of required most economical motor size without consideration of the power consumed when accelerating the vehicle. It would be entirely wrong to base judgment as to essential motor size on an assumed rapidity and ease of get-away. A buyer can be influenced easily by a demonstration when a loaded truck is starting under way from standstill with second or higher gear in mesh, although in reality ability to do this indicates merely uneconomical action during average service conditions. Starting, as well as the propelling of a vehicle, imposes certain requirements on the motor torque, not its power. The favorable shape of a motor torque curve has been explained, dropping gradually from the lowest revolutions per minute on. This gives a double advantage in starting the car with the motor running comparatively slowly. On the other hand, it is often profitable to use flywheel inertia to assist in making the start or overcoming some other increased resistance of short duration.

Avoid Oversize Motor

Quick acceleration in congested traffic is more important in a pleasure than in a commercial car; it causes some overwork of the motor and adds severe requirements of efficiency of the general brake system, which ought to cause a stop at least as quick as the time of acceleration; otherwise a heavy vehicle with a great momentum gained by acceleration brings very undesirable conditions into traffic. It is proper to run a heavy truck with low gear in mesh in a tight place, when a comparatively small motor will develop sufficient torque and power to keep the vehicle within reasonable limits of acceleration without disturbing the general traffic order.

As stated before, it has appeared safe to use an oversize motor in a truck; thus one did away with possible future criticism as to lack of power. With increasing attention being paid to economical performance in service, which ought to influence the scope and extension of commercial car application, the matter of properly selecting motor sizes according to service conditions rises in importance. It can cause not only a general revision of truck motor sizes, but introduce a greater variety of motor sizes for cars of the same capacity, of the same make, whereby different motors will be selected in accordance with prospective service. Thus one may become gradually educated to the fact that the use of a four-cycle, four-cylinder, 4¾ by 6 inch motor in a 3-ton truck, regardless of the prospective service, means at the least a serious disregard of economy. A buyer of commercial cars will do well to look into this side of the question to assure himself that the extra expense connected with the oversize motor remain within allowable limits. The proper solution of the question requires considerable experience and ability. Nevertheless, introducing principles of "scientific management" into the matter of purchasing commercial cars is justified, not restricting their application to the organization and management. In this connection it may be mentioned that although this article deals with the question of motor size only, a similar investigation could be made of the other parts and constructive features of the vehicle.

G. M. Myers, in opening the discussion upon the subject, said that the views as expressed in the paper should be known and understood by truck designers. In many cases, he said, truck motors are converted pleasure car types, and this type is not called upon to deliver its maximum torque. The truck is therefore burdened with a motor weight which is largely a dead weight. In regard to truck speeds, he stated that 13 miles an hour is entirely feasible under certain conditions. However, on American roads and with the average truck driver such speeds are not desirable.

Views of D. Fergusson

Mr. Ferguson thought that the question was largely a determination of the relation of the size of the motor to the work to be done. The motor should be made as small as possible to do the work. It is an easy matter to determine the correct gear ratio for a set of given conditions, and for a given work. The motor should always be well within its capacity and should not be worked to full load, but to only about 75 percent. If a truck engine is worked to its full capacity, it has a short life. For a 5-ton truck, he gave it as his opinion that a four-cylinder motor having dimensions of 4⅞ by 6 inches is about the correct size. In designing a truck, after the ratio of the tractive effort to the weight of the vehicle under load is determined once and for all successfully, it is a simple matter to make all other sized vehicles correct proportionately. It is a big mistake to underpower a truck, he added.

In the opinion of Mr. Bachman the 3,000-pound car outlined in the Batzell paper offers a basis for valuable lines of thought. Tests which he has conducted incline him to believe the statements of both Mr. Batzell and Mr. Fergusson. For economy, he stated that it is first best to know the loads to be carried and the territory of operation, after which a motor and transmission to suit these conditions may be obtained.

To lengthen the truck's life, Mr. Guilder believes that the speed must be kept down and the power must be ample.

Mr. Duryea, when called upon to give his opinion, stated that his experiences had only been with trucks of the lightest type. He believes in keeping the speed low. The design of a motor to get high torque at low speeds, say from 600 to 800 revolutions per minute, is analogous to the draft horse and the race horse. The former gets down and pulls while the latter is meant only for speed. The truck motor must get down in the mud and pull in much the same way.

Mr. Perrin believes that the speed of a truck is dependent and is limited by the tires.

Mr. Batzell declared that he agrees with the Batzell paper and most of the previous speakers. He believes in an engine with small bore for economy. He also stated that the speed depends upon what the owner is willing to pay for tires. He thought that for a 3-ton truck a motor of dimensions of 3¾ by 5½ or 6 inches was about right. For American roads he advocated the speeds for trucks as set down by the N. A. A. M.

In Mr. Coffin's opinion, the foundation of the matter is not in the motor dimensions but in the piston speed. The friction of cast iron against cast iron is now the known consideration, and the piston speed should be relatively low.

Mr. Souther stated that one phase is the weight of the truck motor as compared with that of the pleasure car motor. The truck motor must run more hours and must have more torque than the other type. He advises that the parts be made heavier and better if anything than those of the pleasure car. He also believes in relatively low piston speeds.

In England, Mr. Brewere stated, the design of truck motors was started too light, and they have gained considerably by modifying the early designs. He stated that it is best to give to the truck motor the highest possible compression when it is new to make up for its losses later when it has worn somewhat. In regard to speeds for trucks, he said that in England a speed of 20 miles an hour was looked upon as about right for the average truck motor with a 4-inch bore.

Chase on Motor Testing

The two papers dealing with motor testing, namely, the report of a comprehensive motor test by Herbert Chase and the subject of "Standardization and Co-operation in Motor Testing," by H. L. Connell, brought forth a valuable discussion from the members. The suggestions embodied in the latter paper as to the making of uniform codes for motor testing was most favorably looked upon by all, the engineers agreeing that such codes are much needed in order to be able to compare motors which have been subjected to tests.

Mr. Chase's paper dealt with a most elaborate test upon a Pierce-Arrow motor which extended over a period of 3 weeks and which was conducted in the testing laboratory of the Automobile Club of America in New York city. A number of points of value to engineers were established by the test. It was shown that at high speeds the motor developed a back pressure of nearly 8 pounds per square inch. A surprisingly low thermal efficiency was obtained, the maximum with muffler on and throttle wide open being 17.8 per cent. The substance of the paper is given:

Substance of Chase Paper

In making this test it has been the purpose of the writer to investigate several sets of phenomena which are not frequently taken into consideration in making a test of an motor car engine. If the results obtained lead to the establishment of certain laws which will aid the engineer in improving upon present practice in design, we shall feel that we have been well repaid for our labors. We hope also that the methods followed in securing the results given herein may prove of value to other investigators.

Particular emphasis was laid upon ascertaining the following:

(a) Volumetric efficiency of motor.
(b) Ratio of air to gas consumed.
(c) Loss of heat to water jackets.
(d) Temperature and constituents of the exhaust gases.
(e) Effect of the back-pressure in the exhaust pipe on the power and volumetric efficiency of the motor.
(f) Amount of power required to drive the motor idle under various conditions.

Incidental to these determinations were several others which are interesting and decidedly important in themselves, but many of which are, or should be, a part of every thorough test.

The six-cylinder Pierce-Arrow, 48 horsepower (manufacturer's rating), 1911 model, motor used in these tests is a good example of the T-head poppet valve type. Only a brief description of the motor will be given here since the design is one very familiar to most motor engineers.

The cylinders are of 4½-inch bore and the stroke is 5½ inches. Both inlet and exhaust valves are 2⅜ inches outside diameter, the opening in the seat being 2⅛ inches in diameter and the lift 11/32 inch.

The motor was put in perfect condition prior to the tests and every precaution was taken to prevent the occurrence of variables which might tend to confuse the results. It was found that the power which the motor developed under identical conditions was practically the same at the end as it was at the beginning of the tests which covered a period of some three weeks.

Ignition was furnished by a Bosch high-tension magneto which was set to fire the charge at a point on the piston stroke ⅝ inch before top center when the timing lever was at the full advance position.

The carbureter used on the motor was selected because of the consistently dependable results which it was known to give and because of its ability to supply at all speeds a mixture which invariably produced steady running.

HOWARD COFFIN GREETING HIS GUESTS

Before the first test the carbureter was properly adjusted and this initial setting was not altered through the series of tests.

The following method was adhered to in taking readings: The throttle was opened to the desired position and the spark set for each run at its "best" point within the limits of the advance mechanism, that is, the point of maximum power. This point was determined by the use of the watt-meter which indicates the output of the dynamometer. When the power input is a maximum this instrument gives its maximum reading for the particular conditions existing; hence, it serves a most convenient purpose and makes it unnecessary to take both torque and speed readings and multiply these together to determine the power developed during the time when the proper adjustment is being made.

The mechanical efficiency of a high-speed automobile engine is very difficult to determine with any great degree of precision, owing to the fact that no high-speed indicator has yet been devised (at least so far as the writer is aware) which can be relied upon to give accurately the indicated horsepower. Some cards were obtained with a Hospitalier - Carpentier manograph. These cards are useful only for comparative purposes, and even accurate comparisons are difficult to make in all particulars because of the fact that the card given during one cycle may be quite different from that of the following or some succeeding cycle, although the conditions obtaining outside the cylinder are apparently very constant.

The curves which have been plotted from the results of these tests show in graphic form much more clearly than words can the relation which exists between the variables considered. Some points, however, are worthy of special comment, among others the following:

Charged to Back Pressure

The loss of torque, and consequently power, at high speeds, due to excessive back-pressure in the exhaust connections is a matter which may well receive more attention than it has heretofore been given by engineers. The muffler used in this test is the one regularly applied to this motor under service conditions. It is of a type formed from cup-shaped stampings slightly telescoped at the ends. The bottoms of the cups form baffle plates which are pierced with holes of varying sizes and having different relative positions in adjacent sections, thereby compelling the gases to turn a great number of corners while escaping. The result is a back-pressure amounting to nearly 8 pounds per square inch at high speeds.

More attention might well be paid to the development or proper selection of a muffler which will be silent without giving undue back-pressure. Nearly every muffler manufacturer claims these qualities for his product, but it is apparent that some at least cannot make their claims good. When a proper muffler is used there would seem to be little excuse for a cutout and there is certainly no excuse for using the latter in city traffic (even when the back-pressure is higher than need be); for the curves referred to show only an insignificant difference in power with the throttle wide open at speeds lower than 1,000 revolutions per minute, and no careful driver will run his motor wide open at this speed within city limits unless the grades to be negotiated are far greater than normal.

The problem of properly carburetting a six-cylinder motor is always a difficult one. The writer is of the opinion, however, that the problem would be much more easily solved if the disturbing factors resulting from exhaust back-pressure were removed. Not only does high back-pressure require the doing of unnecessary negative work, but it also leaves a greater weight of exhaust gases in the clearance space and thereby dilutes the incoming charge more than is necessary. With this dilution the tendency toward irregular running is increased and both the thermal and volumetric efficiencies are decreased.

Generally speaking, the per cent of total heat supplied absorbed by the jacket-water was about double that absorbed in useful work at speeds below 600 revolutions per minute. At the speeds of maximum thermal efficiency with wide throttle-opening, the per cent of heat absorbed by the jackets was about one and a half times that absorbed in useful work, and at higher speeds the comparative loss was about the same.

Volumetric Efficiency Considered

For the purpose of this test the author has considered the volumetric efficiency of the motor to be "the ratio of the volume of air passing into the motor in unit time, under test conditions, to the volume swept out by the pistons (i. e., piston displacement) in the same time."

The thermal efficiency of the motor with wide open throttle was a maximum in all cases between 1,100 and 1,400 revolutions per minute. It was nearly the same as between runs, with muffler and without muffler, up to 1,100 revolutions per minute. Above this point, however, the efficiency dropped off in the former case but increased when the muffler was removed up to a speed of about 1,400 revolutions per minute.

The maximum thermal efficiency (with muffler on) was 17.8 per cent with throttle wide open, 15.1 per cent with throttle one-third open and 6.2 per cent with throttle one-sixth open.

The exhaust gas from the motor was found to consist, aside from nitrogen, entirely of CO_2, CO, O_2. No heavy hydrocarbons and no methane or hydrogen were found in any sample. It appears to be impossible from the analyses given herewith to draw any conclusion as to the proportion of the three constituents (aside from nitrogen) which will result under a given set of conditions. Just why this is true is not entirely clear, but it seems probable that somewhat more intelligible results would be secured if a different method of collecting samples of the exhaust gas were followed. The manograph shows very clearly that the combustion within the cylinder is seldom the same in two succeeding cycles. Hence, the gases expelled are not likely to have the same composition. It is, therefore, not certain that a representative sample of gas is collected by the method followed in these tests. It is the purpose of the writer to experiment further along these lines and to secure a more representative sample by collecting a much larger volume of exhaust gas and mixing the latter thoroughly before taking a sample for analysis.

From the analyses here given, however, certain facts are apparent which are not perhaps generally appreciated. Among these may be cited the following: First, that the combustion was not perfect in any run, i. e., there was always some CO present, and in some cases the proportion was almost as great as the CO_2; second, that there was in most cases a trace of free oxygen and in many cases as much as 2 or 3 per cent of the latter existing side by side with CO. This proves beyond question that the mixture within the cylinder was never absolutely homogeneous. Apparently some molecules of oxygen never come into contact with molecules of CO until the temperature is reduced to such a degree that combustion of the latter does not take place.

The ratio of air to gas when plotted against speed gives a curve which appears to follow a fairly well defined law. In any case the characteristics are similar in all the wide open throttle runs, and the variation is not so great as was anticipated. In the wide open throttle runs it varied from 12.2 to 14.2 and in the part throttle runs from 10 to 13.5.

In conclusion the writer wishes to say that he will be gratified if this paper draws forth many questions and a wide discussion of the subject in hand. If there have been omissions of data which should have been included an effort will be made to supply these particulars before the paper is printed in its final form. Furthermore, if the results here given suggest to any member the possibility of amplification in the nature of research work the results of which will be of real value to the society, such suggestions will be welcomed and given careful consideration.

CARL FISHER AND W. G. WALL

In outlining and suggesting methods for co-operation and standardization in motor testing Mr. Connell touched upon the existing methods of testing, which vary widely, almost every laboratory having its individual methods which do not correspond with those of any other. For this reason it is next to impossible to arrive at comparative results. A code which all could follow would largely clear up this confusion, as he explained. It was suggested that governmental co-operation in the matter be also sought as well as that of the members of the society. The salient features of the paper follow:

In doing college laboratory work, and later carrying on an extensive number of tests in the experimental motor room of one of the best known companies, I became impressed with the great lack of uniformity in methods and the uncertainty of comparisons of published data on this account. The suggestion presented itself that the Society of Automobile Engineers could very properly and profitably take up the subject of gasoline motor and allied tests in a manner that would remedy the present conditions.

This work could be developed along several lines. However, the great present need is for uniformity in the carrying on of each class of tests and in the reporting of the same. As conditions are now, there is such a divergence of methods that even the most carefully developed tests are only of value for their individual conclusions and it is almost impossible to link them with other tests for the purpose of drawing conclusions from a broader point of view or for direct comparison. The same condition existed at one time in the field of steam engineering. To meet this, the American Society of Mechanical Engineers developed their codes of boiler and power plant tests. These codes have been revised at intervals as conditions and continued study dictated, and have been held as practically absolute and universal standards. Tests carried on under them give engineers an opportunity to pick out relative values, for there is the assurance that the results are really comparable. The buyer bases his specifications and conditions of acceptance upon these standard tests. Although the time has not yet come when the purchaser of a gasoline motor is given or demands standard tests and characteristic curves, yet that time may not be so very far off. A study of past and present announcements shows a tendency to this. At first there were the exaggerated claims of power which the public soon learned to discredit; then came the general rating by the very arbitrary A. L. A. M. formula, and now we notice numerous statements of the formula rating followed by "actual brake test" readings. The advantage of the old formula method was that it dealt with definite denominations only, and there could be no question as to the methods used behind the mysteriously locked doors of the experimental room. The inadequacy of the A. L. A. M. horsepower rating is well known, but some of those who are stating brake horsepower have based their claims on very low averages, doubtless for fear of reviving the old distrust of such ratings. This state of affairs is obviously unfair to all concerned, but until tests can be conducted in accordance with a code that is universally known to be standard, and to give comparative results, the conservative can hardly follow any other course.

There are other possibilities open to a committee on motor testing after a code has been developed and while developing it. One of these is to act as an advisory board in broadly mapping out lines of investigation. This would apply especially in relation to the work being done at the leading technical schools in this country. Here we have well equipped laboratories and well trained men, but it is surprising to know the difficulty advanced engineering students have in settling upon a line of research. The difficulty of picking a partic-

ular field is not so great, but to know where to begin and how to get somewhere in the allotted time is the sticking point.

There are problems of a general nature and of considerable importance which have had to wait while those of more momentary interest were disposed of. Some of these investigations have lapsed because no laboratory of a manufacturer could give the time to carry them through. With coöperation between the technical, commercial and private laboratories a committee should be able to direct the course of a general investigation so as to make it produce definite results and be of a great deal of benefit.

At its last meeting the Detroit section of the S. A. E. passed a resolution to inquire into the availability of the United States Bureau of Standards for carrying on certain tests of a highly technical nature. This was a definite expression that there is need for work that cannot well be carried on at the motor car factory. It also suggests the possibility of including the government departments in the plan of coöperation.

There are two further advantages that would arise if the S. A. E. took an official or semi-official interest in the technical schools. The first is in the matter of equipment. Manufacturers are constantly being requested to loan or donate motors and other modern equipment to the school laboratories. This is often at the request of some particular student, and when he has completed his course the investigation is not continued. Under the new plan the donor would have far greater assurance that the tests on the apparatus would be carried to the end intended and that a real benefit would result from his generosity. The second benefit would be the training gotten by the young men doing the work, for this would particularly prepare them for the motor industry.

After the reading of the two papers they were laid open for discussion, Mr. Brewer being requested to begin it. In carrying out the tests, he said that in some instances Mr. Chase has taken infinite pains, but not enough trouble in others. The method of measuring the air supply is good, but it is too exhaustive. On the other hand, no consideration at all was taken of the fuel supply, which has a greater bearing on the results. He stated that the metering pin of the carbureter used is difficult of adjustment due to depressions in the air pipe above and below the nozzle. With this type of carbureter, the coefficient of discharge through the orifice from .05 to .07. The result is that the fuel consumption is high and the power low. In discussing the indicator cards obtained Mr. Brewer stated that they are too thick in the middle, perhaps due to the mixture. In a thermal test the object is to eliminate CO and free O as far as possible. The ratio of the weight of the air to the fuel was not great enough. The ratio used was 13 per cent by weight, whereas an 18 per cent ratio is better. The heat loss to the jacket depends largely on the shape of the combustion chamber, which is at variance with statements in the report.

Few Conforming to Code

Mr. Souther stated that he is particularly keen about the subject expounded in the Connell paper. In his journeys about the country and visits to various laboratories the lack of uniformity is very noticeable. There is much divergence in methods of procedure, some being altogether too elaborate and some too meager. There are many operators who are not conforming to any code whatever. He advocated the forming of a code committee as a further division of the standards committee. It is important to have co-operation with the technical schools, he said, as they are only waiting for directions as to how to proceed. If the students are properly educated as to testing methods, they will come to the engineering fraternity better prepared to become valuable members later on.

Mr. Birdsall stated that his only experiences with motor testing of recent years were with respect to a rotary valve motor, more details of which he would vouchsafe at the January meeting.

When asked to say something in this regard, Mr. Pope stated that the subject had already been well covered, but he believes that great progress will be made if some standard method of motor testing is devised.

Heinze Cites Some Examples

In response to Mr. Brewer's remarks as to the influence of carbureters and fuel mixtures on tests, J. O. Heinze cited some experiences which he has had with carbureter adjusting. With different types of intake manifolds, he arrived at different results. If the matter of the carbureter adjustment were all there was to consider, as Mr. Brewer stated, the results of Mr. Heinze's tests would not have varied so widely. In place of the manifold tube between the carbureter and that point of the manifold where the separate branches lead to the different cylinders, he substituted a piece of glass tubing of the same size so that he could observe what was taking place. At low engine speeds, the mixture in passing from the carbureter would get fogged for a few inches, then it would clear itself in passing on to the manifold branches. At higher speeds this fog appeared for a longer length of the tube. Mr. Heinze therefore decided that a time factor is necessary in order for the gas and air to thoroughly mix. He further decided that it is best to use a long intake for high speed engines and a short one for low. To be theoretically correct, therefore, the manifold length should vary with the speed of the motor. This is manifestly impossible, but the next best thing to do is to make the manifold length depend upon the piston speed at which the best operation is obtained. It was a question, Mr. Heinze went on to say, just how much of Mr. Chase's paper can be used by the industry. Block tests are not of the greatest value since the conditions under which they are taken are not the same as road conditions. The lack of uniformity in tests is also disparaging and detracts from the paper's usefulness. Whatever is done in the matter of testing, those in charge should be sure of their premises. It is easy to introduce unknown errors. Results usually vary with conditions imposed and the degree of perfection of the apparatus.

In answer to Mr. Heinze, Mr. Brewer stated that modern practice in England gives a fairly large space for the outflow of gases from the carbureter, which space is hot-water jacketed. It is largely a matter of critical length, rather than of actual length.

The engine given for the tests was a standard 1911 model of the Pierce-Arrow type, Mr. Fergusson said. The friction losses which are given in the report will soon disappear, after the motor has run awhile, he said. He believes that the operation of the motor was changed due to the use of a carbureter other than the Pierce carbureter for which the motor was designed. He can not understand why such a large back pressure was found, since on his own tests conducted with the same type of motor he obtained very little.

C. L. Scheppy, also of the Pierce-Arrow company, stated that the performance was altered by the use of another carbureter. He thought that it would have been better and fairer to the motor if its worn carbureter had been used.

The curves or cards supplementing the report are governed somewhat, Mr. Hemple said, by the size and length of the manograph tube. He stated that manograph results are purely comparative and not absolute. For this reason he would not credit any results obtained with the instrument at speeds over 800 revolutions per minute. He thinks that in an experimental department of ordinary type it would be impossible to conduct so extensive a test as that outlined. A code would be a great aid in testing, and he offered the suggestion that if a code is devised by the society there should be a record for the pressure in the manifold. It is an important factor.

Consider Fuel Efficiency

F. H. Floyd believes that the efficiency of the fuel should be considered, and in testing motors it would be well to test this also. The question is largely a matter of refining. We are to have heavier fuels every year, and from his tests he believes them to be better for ordinary work than the high gravity fuels.

G. T. Briggs advocated the taking of carbureter tests. He has found great differences in using different manifolds and ignition apparatus. When he has classified all his data he will submit it to the society.

If the relation of dynamo meter to road tests could be fixed, it would be of great value, Mr. Perrin stated. As a rule carbureter men do not take much stock in block tests, depending on road performances only.

The A. S. M. E. testing code is a good one by which to be guided, said F. Jehle, which code, although for steam work, has a good many points which could be followed. The mechanical efficiency is a factor, and he believes that by previously determining it the indicator cards can be used to advantage. In using cards the compression reading at every valve speed should be taken. Regarding the

use of a standard brake arm, as advised in the Connell paper, he thought it well to consider the use of a brake arm, which is calibrated in foot-pounds rather than pounds. The length of the arm would then be immaterial. He stated further in going over the Chase paper that it would be best to give the valve diagram in inches of piston travel rather than degrees. In his experiments he has found no relation between back pressure and torque.

Mr. Chase Explains

In summing up his paper and closing Mr. Chase explained that some of the considerations which might otherwise have been taken into account in the test were left out, due to the limited number of observers. The reason for the non-use of the Pierce-Arrow carbureter was explained in that this carbureter was ex- a hot air intake and such could not be given with the apparatus as set up. He believes that the relation of road and laboratory testing is an important one and hopes that the engineers on both sides of the matter will get together. The limitations of the manograph are appreciated, he said, as was mentioned in the report. As to the fuel this was of commercial grade. It would perhaps have been better to have obtained a fractional distillation of it. As to the reading of the maximum compression at each stroke, he stated that the A. C. A. laboratory has recently acquired an instrument for this purpose, which, he thinks, will be of value. As far as possible to do so the A. C. A. will co-operate in this matter of testing with the technical schools and the society.

A motion was unanimously carried to appoint a committee to draft a standard code for motor testing.

Mr. Birdsall spoke on the government co-operation in testing. This matter has been taken up by a committee of the Detroit section of the society with the standards bureau of the department of commerce and labor. This committee is composed of Messrs. Heinze, Stoddard and Birdsall. A letter from Mr. Stratton, head of this bureau, suggests a code committee of the S. A. E. He could not say as to the charges for assisting in such work, but he is in thorough accord with the matter.

An idea which was brought out by Mr. Heinze and which has been before the Detroit section for some time is that a fund might be started for the establishing of a laboratory at Detroit by the manufacturers in and near Detroit.

In reiterating Mr. Heinze's remarks on this Mr. Birdsall cited the case of one manufacturer, who, when approached on the subject, stated that he had just recently appropriated $10,000 to establish a laboratory of his own, and he regretted that he had not heard of the scheme before making the outlay. However, this manufacturer said he would be willing to turn over the apparatus to a general laboratory under satisfactory conditions. A motion was unanimously carried that the matter of establishing in Detroit of a general laboratory for all makers of engines be referred to the Detroit council for action and investigation.

The engineers are interested in and are working on the worm gear problem. This was brought out by the discussion which followed the reading of the paper on worm gears by Frank Burgess, who is a gear manufacturer of long experience. He favors the Hindley type as is brought out in the paper, the substance of which follows:

European practice, extending over a period of 15 years, has given ample evidence of the eminent success of the helical type of gearing, and I feel confident in saying that in the near future a large percentage of the cars in the United States will be equipped with this drive. Mileage records of 50,000 to 124,000 have been established.

Regarding the terms "worm," "helical" and "spiral" I would say that "spiral gear" is the term commonly given to a gear the teeth of which have a uniform twist parallel to the axis, although for technical correctness the word "helical" should be used instead of "spiral." A spiral is a line generated by progressive rotation of a point around a fixed axis, with a constantly increasing distance from the axis. Two forms of the spiral are the plane and the conical. Kent states: "When the axes of two helical gears are at right angle, and a wheel of one, two or three threads works with a larger wheel of many threads, it becomes a worm gear, or endless screw, the smaller wheel or driver being called the worm and the larger or driven wheel the worm wheel."

I suggest standardization of terms, and that to avoid confusion any gears of the helical type transmitting motion with shaft angle at 90 degrees, with a speed reduction less than 10-1, be termed "right angle helicals"; and with any other than 90 degrees shaft angle the term "helicals," stating specifically the exact angle of shafts. If shafts are parallel the term "helical spurs" should be used.

As the term "right angle helical" is not as convenient as the term "worm gear," and inasmuch as for motor car work most ratios will be less than 10-1, with 90 degrees shaft angle, I would suggest the term "helical gears" as most appropriate. Otherwise it would be better to use the general term "worm" or "worm gear" to include all reduction ratios, even as low as 1-1. This matter should be settled promptly one way or the other.

Development of Helical Gears

During the past 20 years great strides have been made in the development of helical gears. The adoption of these gears for parallel and right-angular drives has made practically a new element in machine design. Until this form of gearing was made commercial by the invention of special machinery suitable for economical production, there was considerable reluctance on the part of the manufacturers to adopt the helical gear.

The principal reason for the adoption of the helical form of tooth appears to be its peculiar quality of silence, regardless of speed or load. With the best methods of design and assembly, great durability, strength and efficiency are obtained.

The successful worm gear should embody the following qualifications:

1. Cheapness of construction.
2. Strength for resisting shocks.
3. Hardened and smooth surfaces for durability.
4. Material of a suitable composition to reduce friction.
5. Simplicity of construction and mounting.
6. Perfect bearing condition.
7. Noiselessness at any speed or load.
8. Reversibility.
9. Lightness in weight.
10. Efficiency in power transmission.

Considerable discussion has arisen in regard to the relative merit of the straight and Hindley types, the latter having been first used by Hindley, of York, England. In my opinion both can be used successfully, although each has its own advantages and disadvantages. For most purposes, particularly where considerable power is to be transmitted, the Hindley has the advantage, but with ordinary machinery it is somewhat more difficult to obtain the same degree of accuracy that can be obtained in the case of the straight type.

From tests made there is no question but that there is a larger bearing surface on the Hindley type of worm than on the straight. Therefore, this type of gearing will for the same pitch present a bearing of greater durability and manifestly heat less than the straight type, particularly under heavy load.

The straight type may have less trouble with end-thrust bearings. The worm can move in its position longitudinally with the worm axis and therefore does not require as close adjustment of the end-thrust bearings.

With first-class bearings the Hindley type has the advantage, as a smaller and lighter gear can be used, thus reducing expense, especially if made up in large quantities.

The hardening process for the worm should be such as to cause the least amount of distortion, careful methods of heat treatment being employed. The benefit of this is that the gear teeth of the Hindley type, which it is impracticable to grind, can thereby be lapped, making teeth concentric with the hole, which is very essential in a worm of this type. The gear should have a mirror-like polish. In this way with hardened concentric polished tooth surfaces the Hindley type presents a better surface of contact than the best form of straight worm, even though the latter is finished by grinding.

The gear is flanged on one side with eight lugs with hole in the center of each lug for mounting same on differential casing. There is a slight shoulder on each side of this gear so that the differential casing will form a double web, stiffening the gear so that there is no opportunity for side vibration, thereby reducing the bronze metal to a minimum.

The worm gear should be made of a special mixture of hard bronze. The gear should be slightly polished after being cut to insure a perfectly smooth glazed surface to mesh with the hardened polished worm. This set of gears, properly housed, with ball bearings and the right lubricant used, will give an efficiency of at least 90 to 95 per cent.

A simple method of testing the gears for efficiency without elaborate apparatus is to run them in their regular housing, containing a bath of oil, subjected to load to be transmitted. If they do not have a high temperature after running several hours they indicate high efficiency and suitability for the given purpose.

H. C. Thomas Disagrees

A letter from H. C. Thomas on the paper was read, the writer being absent. He disagrees on the matter of changing the worm gearing nomenclature as suggested in the paper. He favors the straight type or worm and thinks there is no advantage of mounting two worm gears on a rear axle as is taken up by Mr. Burgess.

R. H. Rosenberg stated that what he had to say was practically a reiteration of the Thomas letter. In the Hindley gear more than one tooth must engage at a time. The refinements in metals and manufacturing methods make this double contact feature unnecessary. Since the Hindley has more contact than the straight type, there is more friction and consequently more heat and loss. He does not believe that the Hindley gear can be manufactured in this country, due to the trouble it makes. It is difficult to determine the beginning and end of the warp and also the depth. Mr. Alden said that there is agreement on the relative merits of either type. The information on both sides is both positive and absolute. He leans to the straight type and stated that it predominates in the proportion of about 10 to 1 over the hour glass type.

The superiority of either type is a matter of its commercial success, in the opinion of G. L. Markland, Jr. He believes that the Hindley will not be a success because it requires too accurate an adjustment, while the straight type does not.

Mr. Whitney, Mr. Heinze and Mr. Burgess also discussed the paper.

Contest Board Rejects de Palma's Marks

American Automobile Association Awards Speedway Records to Dawson and Tetzlaff — Santa Monica Times Not Approved Because Original Tape Is Not Sent In

NEW YORK, June 29—At the meeting of the contest board of the American Automobile association this week considerable business of importance was transacted, which included the awarding of the speedway records to Tetzlaff and Dawson because de Palma failed to finish; the suspension of two National agents and a Stutz dealer for advertising stock car performances in connection with non-stock events; a decision in the matter of the Flanders entry in the Santa Monica road races and the refusal to accept the records made in the same event until the original timing tape is sent to the A. A. A. The bulletin of the meeting is as follows:

For advertising the performance of the No. 8 National car which won the 500 mile race at the Indianapolis motor speedway May 30, 1912, as being the performance of a "stock car," the Wisconsin Auto Sales Co., of Milwaukee, Wis., and the Howard Automobile Co., of San Francisco, Calif., agents of the National Motor Vehicle Sales Co., manufacturer of National cars, were disqualified and suspended to January 1, 1913. The 500-mile race was run under the rules and with the sanction of the contest board as a class E special nonstock event and was open to any car with a piston displacement of under 600 cubic inches and a minimum weight of 2,000 lbs.

For advertising the performance of the No. 4 Stutz car which won the 50-mile race at Rockingham park, Salem, N. H., on June 8, 1912, as being the performance of "an absolutely stock car," the Empire Motor Car Agency, of Boston, Mass., agents of the Ideal Motor Car Co., of Indianapolis, manufacturer of Stutz cars, was disqualified and suspended to January 1, 1913. The race in question was run under the rules and with the sanction of the contest board as a class E special nonstock event and was open to any motor car with a piston displacement of under 600 cubic inches.

Rule 75(a) of the 1912 contest rules prohibit the advertisement of the performance of a motor car in a sanctioned event as being the performance of a stock car unless such performance is made in a contest regularly sanctioned for and open only to registered stock cars or stock chassis.

These two races were not restricted to stock cars and no technical examination is made by the A. A. A. technical committee of cars competing in non-stock events to ascertain whether they check up with the sworn and approved complete technical specifications on file with the contest board, as is required under the contest rules in those events which are open only to stock cars or stock chassis.

The formal application for reinstatement to good standing of Walter Clark, of Fort Worth, Texas, who participated in unsanctioned track meetings at Waco, Texas, in 1911, was considered and the board refused to reinstate him.

The following official records were allowed and accepted:

Speedway records regardless of class, 500-mile race Indianapolis motor speedway, May 30, 1912.

Distance miles.	Car.	Driver.	Time.
100	...Fiat	....Tetzlaff	....1:13:37.25
150	...Fiat	....Tetzlaff	....1:49:52.84
200	...Fiat	....Tetzlaff	....2:25:50.52
250	...Fiat	....Tetzlaff	....3:07:13.94
300	...National	....Dawson	....3:48:49.30
350	...National	....Dawson	....4:25:15.27
400	...National	....Dawson	....5:04:14.23
450	...National	....Dawson	....5:44:04.54
500	...National	....Dawson	....6:21:06.03

Note.—The time of the No. 4 Mercedes, driven by dePalma, bettered all of the above times, with the exception of the 500-mile mark, but under Rule 79 of the 1912 contest rules no record at an intermediate distance is allowable unless the car finished the event. The No. 4 Mercedes discontinued the race in the one hundred and ninety-ninth or next to last lap.

The participation of the two Flanders chassis, equipped with special—modified E. M. F.—motors, having a bore of 4 inches, a stroke of 4½ inches, and a total piston displacement of 226 cubic inches, in event IV of the Santa Monica road race for class C non-stock cars of 161 to 230 cubic inches, on May 4, 1912, as Flanders, and in the speedway events at the Los Angeles motordrome on May 5, 1912, as E. M. F., contrary to the ruling telegraphed by the chairman of the contest board to E. G. Kuster, the board's representative in attendance at these two contests; to the official referee of the road race, R. P. Hillman, of Los Angeles, and to the promoter of the two events, A. M. Young, of Los Angeles, was considered and it was unanimously decided to accept the resignation of Mr. Kuster as the official representative of the contest board for southern California, to declare Mr. Hillman ineligible for appointment to any official positon in connection with sanctioned contests until January 1, 1913, and to disbar the promoter, A. M. Young, for a similar period.

In view of the extenuating circumstances, due apparently to a conflict in authority in the interpretation of the contest rules, it was decided to approve the awards as made by the referees in these two contests, but that in future events sanctioned by the contest board the nomenclature of special cars must be clearly defined.

The time made by various cars in both the Santa Monica road race and the motordrome events were not accepted and allowed as official records for the reason that the board had not yet been able to secure possession of the original printed ticker tape of the timing apparatus used to record the times in these two events.

The following amendments to the 1912 contest rules were adopted; to become effective August 1, 1912:

"No car with a bore, stroke and piston displacement of a different size from the regularly catalogued product of a manufacturer shall be entered in any sanctioned event until its manufacturer shall have filed with the contest board, on official blanks provided for the purpose by the contest board, sworn certificates giving the bore, stroke, number of cylinders, total piston displacement, horse power, and year and model name of the cars, and such cars must be officially entered, programmed and advertised in strict accordance with such registration.

"All other cars must be entered, programmed and advertised in strict accordance with catalogued specifications."

"Rule 113 (on Road Racing) Repair Pits.—There shall be located at the start and finish line one repair pit for each car started, not less than 15 feet long and 8 feet wide. The pits must be located on the right of the course in the direction in which cars are traveling. If located on the same side and in front of the grandstand, there must be an intervening distance of not less than 15 feet between the pits and the stand."

SPEEDWAY FOR NEW YORK

New York, July 1—Formal announcement of the plans for the construction of the Metropolitan motor speedway are made by the Metropolitan Motor Speedway association of New York, which has incorporated with an authorized capital of $1,500,000.

The association has taken over 300 acres on the Jersey meadows near Newark for the purpose of constructing a motordome and stadium. Ground will be broken next month, and the speedway is to be completed within a year. On July 4, 1913, the premier event will be staged—an international 500-mile race. Engineering offices have been opened in the Ordway Building, 207 Market St., Newark, and a corps of experts engaged.

A. R. Pardington, who has been actively connected with the Long Island motor parkway as vice-president and general manager and the Motor Cups Holding Co., is vice-president and general manager of the Metropolitan Motor Speedway, Inc. Fred J. Wagner also is heavily interested financially and as a director. H. E. Hoyt is president of the speedway. Theodore F. Keer is treasurer and W. H. Osborne secretary. The latter also is secretary of the Commercial Maintenance and Motor Co.

It is not merely intended to make the speedway a stage for motor speed contests. Long distance motorcycle races and other races will be held on the brick oval, while the infield will be available for aviation meets, baseball, football, field and track athletics, circuses, Wild West shows, etc. The entire plant will be fenced in by a high fence. The speedway itself is to be 60 feet wide, excepting on the turns which are to be 75 feet in width and scientifically banked with saucer curves.

Grand stands with box and promenade seats will be erected the entire lengths of the straightaway stretches and the proposed capacity of these stands is 200,000. Parking space to accommodate 10,000 cars will be provided in the infield, which will be accessible by means of three double track tunnels, forming the entrance and exit of cars and pedestrians. Garages, repair and machine shops, pits, a hotel and club house, a restaurant and other buildings will be erected. For night events, such as 24-hour races, a number of which are to be run, the 2 miles of speedway will be illuminated in such a way as to provide plenty of light without blinding the drivers.

RESULTS OF NARBERTH MEET

Philadelphia, Pa., June 29—All things considered, the initial race meet of the Belmont Motor Club, held this afternoon at the Belmont Driving park, Narberth, was an ambitious attempt. The 50-mile free-for-all race had an entry list of ten, only four of whom, however, faced the starter. It was won by a Klinekar.

In the 1-mile exhibition for the track record, although three attempts were made, Buman's :54.26 still stands, the nearest approach to it being made by John Menken in a Klinekar, who made the mile in :58 flat, which, by the way, was the fastest lap of the afternoon.

The program was marred somewhat by the withdrawal, enforced and otherwise, of several of the entries, so that with one exception, the fields were small. By the application of liberal quantities of calcium chloride, assisted by an autocar sprinkling wagon that made trips around the track during intermissions between events, the

Tacoma Eager for Road Racing Carnival

raising of dust was reduced to a minimum.

The summaries:

Five miles, 161-230 class—Bauer, Buick, won; Baker, Cartercar, second; Smith, Empire, third. Time, 6:02⅘.

Five miles, 231-300 class—Homan, Bergdoll, won; Morton, Mercer, second; Ringler, Mercer, third; Fairman, Klinekar, fourth; Gray, Schacht, fifth. Time, 6:00⅘.

Ten miles, 301-450 class—Menker, Klinekar, won; Bocksom, Stutz, second; Millichap, G. J. G., third. Time, 9:55.

Trial for track record—Menker, Klinekar, :58; Frietag, Fiat, 1:01.

Fifty miles free-for-all—Menker, Klinekar, won; Blocksom, Stutz, second. Time, 53:39.

Trial for track record—Haup, Chadwick, 1:02.

Ten-mile handicap—Frietag, Fiat, won; Smith, Jr., Empire, second; Gray, Schacht, third. Time, 10:50.

Ten mile consolation handicap for non-winners—Smith, Jr., Empire, won; Gray, Schacht, second; Ringler, Mercer, third. Time, 5:39.

CONSOLATION PRIZES FOR LOSERS

Indianapolis, Ind., July 1—The Indianapolis Motor Speedway Co. has divided $2,100, representing the eleventh and twelfth prizes in the 500-mile race Memorial day, among the drivers who were unable to finish on account of accidents. As only ten cars finished, the two last prizes were not claimed. The $2,100 has been distributed on a basis of the number of laps covered by each driver. It was found that the fourteen cars failing to finish covered 1,093 laps, which gave a basis of $1,9213 a lap for each of the fourteen drivers.

Distribution of the $2,100 has been as follows: Stutz, Anderson, eighty laps, $153.70; Mercedes, De Palma, 199 laps, $382.34; Case, Disbrow, sixty-seven laps, $128.73; Case, Herrick, fifty-four laps, $103.75; Mercedes, Wishart, ninety two laps, $176.76; Lexington, Knight, seven laps, $13.46; Simplex, Dingley, 116 laps, $222.87; Cutting, Burman, 157 laps, $301.54; Firestone-Columbus, Rickenbacher, forty-three laps, $82.62; Marquette-Buick, Liesaw, seventy-two laps, $138.34; McFarlan, Marquette, sixty-three laps, $121.04; Opel, Ormsby, seven laps, $13.46; Lozier, Matson, 110 laps, $211.34, and National, Bruce-Brown, twenty-six laps, $49.95.

ELGIN RACES ABANDONED

Chicago, July 2—Directors of the Chicago Motor Club at their meeting this afternoon decided to abandon the attempt to hold the road races at Elgin this summer. The Elgin Automobile Road Racing Association, following this announcement, declared that no attempt would be made by that organization to promote the events. This decision on the part of the Chicago Motor Club was anticipated. First of all, the club gave up the idea of staging the annual stock chassis events, but desired to try something in the free-for-all line in August,. Following a canvass of the situation it was found entries were hard to get and the prospects of success so small that it was deemed best to give up the races for this year.

Washington Motorists Secure Star Attractions for Their Meet This Week, Including Tetzlaff, Hughes, Mulford and Other Drivers of Note—Course in Shape

TACOMA, WASH., June 27—More cars than were entered in the Santa Monica races last May already have been entered in the 2-day race meet at Tacoma, July 5 and 6. The latest entries received for the races on Saturday, July 6, are two special Flanders cars, one to be driven by Jack Tower and the other by Bob Evans. These with George Joermann, who will drive the Maxwell that won first place at Santa Monica in the small car event May 5, make the complete trio of winners of that event now entered for the similar event at Tacoma.

The complete list of entries to date is as follows: Fiat, Tetzlaff; Fiat, Bragg; Fiat, Verbeck; Stutz, Cooper; Stutz, driver unnamed; National, Whalen; National, DeVore; Pope-Hartford, Hayes; Knox, Mulford; Benz, Bergdoll; Mercer, Hughes; Mercer, Mulford; Mercer, driver unnamed; Cole, Sebastian; Maxwell, Joermann; Flanders, Evans; Flanders, Tower; Ford, Bennett; Ford, driver unnamed.

The program has been rearranged so as to have two events each day of the meet. On July 5 there will be the 150-mile event for medium-weight cars and the 200-mile event for heavy cars, taking in the same classification that governed the big Indianapolis race—under 600 cubic inches piston displacement. On July 6 the meet will open with the light-car event for 100 miles and the 250-mile free-for-all will follow. The races will begin at 10 o'clock each day.

The drivers all agree that the Tacoma circuit is built on fast lines and that a high average will be maintained throughout the two big races of the 2-day meet. Cooper believes the average will be well above 70 miles an hour; and that from 100 to 110 miles an hour can be made on the straightaways is the opinion of Tetzlaff. The course has cost $6,000 and it has taken less than 2 months to build it. Sprinklers and steam rollers, oilers and packers will continue to iron out all wrinkles and soft places until the day before the races.

The curves are all mile-a-minute turns. A little Ford racer has taken them at better than 60 miles an hour and making sensational speed on the straightaway.

The grandstand is practically completed, and arrangements made for transporting the crowds to it. Martial law will prevail about the entire circuit from sunrise to sunset on both July 5 and 6, and national guards will patrol the course and keep spectators within established lines. Street cars will operate on a regular schedule both days beginning at 5 o'clock in the morning, so that there will be as little delay as possible in getting all persons seated. As it is now, the city expects to be overwhelmed with visitors. Special trains will be run every day over the Northern Pacific Railroad to the grand stand, beginning early each morning.

TRACK MEET AT LAUREL

Washington, D. C., June 29—Designed to afford some amusement for the big crowds attending the democratic convention in Baltimore this week, a 2-days' race meet began on the mile dirt track at Laurel yesterday, with Bob Burman as the star. The convention was too attractive, however, and less than three hundred people attended the first day. Burman won back the Remy brassard in his Blitzen Benz, covering 3 miles in 3:20. He had little competition, as only Elmer MacDonald, in the Benz 110 and I. C. Barber, a local driver, in a Warren-Detroit, opposed him. They finished in the order named. The 25-mile race for the Motorine trophy, for cars of 600 inches and less, brought out eight starters. Burman won the event in 27:32, with Raimey's Ohio 99, second and French's Lozier third. Burman gave an exhibition mile in the Benz and made a new Maryland state record of 58¾.

The second day's racing at Laurel yesterday brought out the same fields as the day before. The crowd was very small and the promoters will be out a pot of money on the venture. Burman again clipped the Maryland state mile record, bringing it down to :54¾ in the Blitzen Benz. Summaries:

Five miles—Frank Blair, Mercer, won; I. C. Barber, Warren, second; F. Stewart, Reo, third. Time, 6:04.

Second heat for Remy brassard, 3 miles—E. MacDonald, Benz, won; R. Burman, Benz, second. Time, 3:11¼.

Third heat, Remy brassard, 3 miles—R. Burman, Benz, won; E. MacDonald, Benz, second. Time, 3:06½.

Five miles—R. Burman, Cutting, won; J. Raimey, Ohio, second; I. C. Barber, Warren, third. Time, 5:34.

Five miles—Raimey, Ohio, won; Barber, Warren, second; Blair, Mercer, third. Time, 5:55.

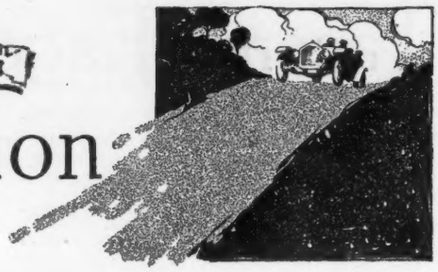
Free-for-all handicap, 5 miles—MacDonald, Benz, scratch won; Barber, Warren, second; C. Campbell, National, third. Time, 6:05½.

Australian pursuit race — Burman, Benz, won, covering 8½ miles. Time, 8:19¼; Campbell, National, second.

DENVERITES REACH CHICAGO

Chicago, July 1—Ten cars carrying thirty persons representing the Denver Chamber of Commerce and several towns near the Colorado metropolis reached Chicago this evening and will stay here until Friday morning. This is the sociability run that left Denver the morning of June 25.

Routes and Touring Information



CHICAGO TO HAMMONDSPORT

ELBURN, Ill.—Editor Motor Age—Can Motor Age furnish me with a road map showing the road from Chicago to Hammondsport, N. Y.?—W. M. Cook.

Motor Age cannot show a map which will go into detail as much as you probably want but the Blue Books, volumes 4 and 1 will give you these as well as running directions on the entire trip. Important towns en route to Toledo are South Chicago, Whiting, Grasselli, Gibson, Hassville, Highlands, thence east to Hobart, or, instead of turning east at Highlands, you might proceed directly south through that town, passing through Schererville, thence east via Merrillville, to Valparaiso, at which point the routes merge, and continue via LaPorte, and South Bend in Indiana; proceed to Mishawaka, Osceola, Elkhart, Goshen, Millersburg, Ligonier, Wanaka, Brimfield, Kendalville, Waterloo, Butler, Edgerton, Bryan, Stryker, Archbald, Wausean, Delta, Swanton, Java, and Toledo.

Head north from Toledo, passing through Ida, Dundee, Milan, Stonycreek, Ypsilanti, Wayne and Dearborn to Detroit. This is merely a suggested option and allows you to go through Canada to Buffalo, N. Y. Cross to Windsor, Ont., and proceed through Essex, Ruthven, Leamington, Dealtown, Blenheim, Ridgetown, Clachan, Wardsville, Strathburn, Delaware, Lambeth, London, Thamesford, Ingersoll, Woodstock, Brantford, Alberton, Grimsby, Beamsville, Jordan, St. Catherines, Homer, St. David, Niagara Falls, and Tonawanda to Buffalo.

Through this section of Canada you will find a level farming country. After leaving Tonawanda take the river road and Delaware avenue.

Should you prefer skirting the southern shore of Lake Erie and follow the route taken by all through travel, you pass through Stony Ridge, Lemoyne, Woodville, Fremont, Clyde, Bellevue, Monroeville, Norwalk, Berlinville, Birmingham, Henrietta, Amherst, Elyria, Ridgeville, Bement, Dover, Rocky River, to Cleveland; continuing thence through Euclid, Willoughby, Mentor, Painesville, Madison, Unionville, Geneva, Saybrook, Ashtabula, Amboy, Conneaut, East Springfield, Girard, Fairview, Erie, Northeast, Westfield, Fredonia, Irving, Evans, to Buffalo.

Two routes can be offered to Hammondsport, the more northerly one being more than half macadam. This routes through Williamsville, Clarence, Pembroke, Batavia, Stafford, Leroy, Caledonia, Avon, Geneseo, Groveland, Dansville, Perkinsville, Cohocton, Avoca, Kanona, Bath, and Hammondsport.

The second routing with a few exceptions follows the Empire tour outline through Ebenezer, East Aurora, Wales Center, Harris, Buffalo Hill, Varysburg, Orangeville, Warsaw, Rock Glen, Silver Springs, Chace, Castile, Portageville, Hunts, Swains, Garwoods, Canaseraga, Dansville, Arkport, Hornell, Howard, Avoca, Bath and Hammondsport.

LANARK TO LE ROY, ILL.

Lanark, Ill.—Editor Motor Age—Please outline a route from Lanark to LeRoy, Ill. The trip is to be made in July.—Fred Wolf.

Sterling, Rock Falls and Van Patten lead you to Princeton, 40 miles over good natural roads with a few stretches of sand. You will of course want to visit Starved Rock and Deer park, and to do that you motor through Hollowayville, Seatonville, Peru, La Salle, Utica and Starved Rock. From Princeton to Starved Rock is a distance of 29½ miles. Continue 8 miles to Ottawa, and head south for Peoria over gravel or dirt roads 85 miles through Grand Ridge, Streator, Wenona, Roanoke, Metamora, Washington. A 70-mile run will find you in LeRoy, the intermediate towns being Groveland, Tremont, Mackinaw, Danvers, Bloomington and Downs.

This is a leisurely 2-day trip with Ottawa the stop for the first night. Your run to Starved Rock is about 98 miles, and you can plan to lunch at La Salle, spend a couple of hours in Starved Rock and make Ottawa in an hour or so, as it is only 28 miles. Your second day's run will register 155 miles and Peoria can be figured as the noon stop.

MINNESOTA ROADS

Massena, Ia.—Editor Motor Age—What is the best route from Atlantic, Ia., to Jenkins, Minn.? Jenkins is near White Fish lake and is about 150 miles north of Minneapolis.

We have thought that perhaps the best route would be through Des Moines, Albert Lee, Minn., and Minneapolis. We are more anxious to know about that road north of Minneapolis.—Henry Greenwaldt.

Go to Des Moines over the White Pole road passing through Anita, Adair, Menlo, Stuart, Dexter, going north to Redfield, and east on the River-to-River road through Adel, Ortonville, Waukee, and Des Moines. On the River-to-River road go east to Altoona, Mitchellville, Colfax and Newton. Run north to Laurel, Marshalltown, Albion, Liscomb, Eldora, Iowa Falls, Hampton, Sheffield, Rockwell, Mason City. Between Mason City and St. Paul, 142 miles, the towns are Manly, Kensett, Northwood, Glenville, Albert Lea, Owatonna, Milford, Faribault, Dundas, Northfield, Farmington, Rosemount and St. Paul. It is but 10 miles to Minneapolis leaving over University avenue.

You will find a well traveled road from Minneapolis to St. Cloud through Robbinsdale, Osseo, Champlain, Anoka, Dayton, Elk River, Big Lake, Becker, Clear Lake, Cable and St. Cloud, a distance of 67 miles. The road now lies to Brainerd through Sauk Rapids, Watab, Rice, Royalton, Gregory, Little Falls, Belle Prairie, Topeka, Ft. Ripley, Moffat, Crow Wing. Jenkins is not for fram Brainerd.

Through Iowa and as far as Albert Lea, Minn., there are fair natural dirt roads which are good in dry weather; Albert Lea to St. Paul you will find mostly gravel roads. Some sand will be found between Watab and Royalton, but on the whole the stretch from St. Cloud to Little Falls is fine. Belle Prairie to Brainerd will find some more sand.

The Blue Book No. 5 will give you running directions to Minneapolis.

GOING TO MOBERLY, MO.

Oklahoma City, Okla.—Editor Motor Age—I am contemplating a motor trip to Moberly, Mo., and would like information on the best and shortest route. I have some information on the old Glidden route from here to Kansas City, but think there may be a nearer route via. Wichita and crossing the Missouri river at Booneville, Mo., thence to Moberly. Or, if Kansas City is the best route can we go along the north side of the river?—E. C. Wills.

Go west to El Reno and the Chisholm trail will take you north to Wichita, Kans., through Kingfisher, Dover, Hennessey, Bison, Waukomis, Enid, Kremlin, Pond Creek, Jefferson, Medford, Renfrow, Caldwell, Drury, South Haven, Wellington, Wichita. Continuing to Newton on the Santa Fe trail you head east to Kansas City and follow through Walton, Peabody, Florence, Clements, Elmdale, Cottonwood Falls, Saffordville, Emporia, Waverly, Agricola, Williamsburg, Ottawa, Wellsville, Edgerton, Gardner, Olathe, Martin City, Westmoreland, Kansas City.

Two routes are offered you to Marshall,

Mo. The Santa Fe trail can still be followed through Centropolis, Independence, Blue Town, Buckner, Levasy, Wellington, Lexington, Dover, Waverly, Grand Pass, Malta Bend, and Marshall; or taking a road which is macadamed the first 30 miles you pass through Centropolis, Independence, Blue Springs, Grain Valley, Oak Grove, Odessa, Mayview, Higginsville, Corder, Blackburn, Mt. Leonard, and Marshall. Dirt and clay roads prevail from Oak Grove on and continue from Marshall through Slater, Glasgow, Armstrong, Yates, Higbee, Renick and Moberly. It is necessary to be ferried across the Missouri river to Glasgow and the charge is $1.

CHICAGO TO MINNEAPOLIS

Chicago—Editor Motor Age—Kindly inform me about the best route from Chicago to Minneapolis, Minn. I would go sometime in July and make it a 3-day trip. What places would be the best to stop over night.—T. K. Thureson.

Your noon stop the first day would be Lake Geneva, 72 miles; first night, Madison, 78 miles; second day, noon stop, Baraboo, 79 miles; night stop, La Crosse, 103 miles; noon stop third day, Eau Claire, 86 miles; night stop, either St. Paul, at 87 miles, or Minneapolis at 97 miles.

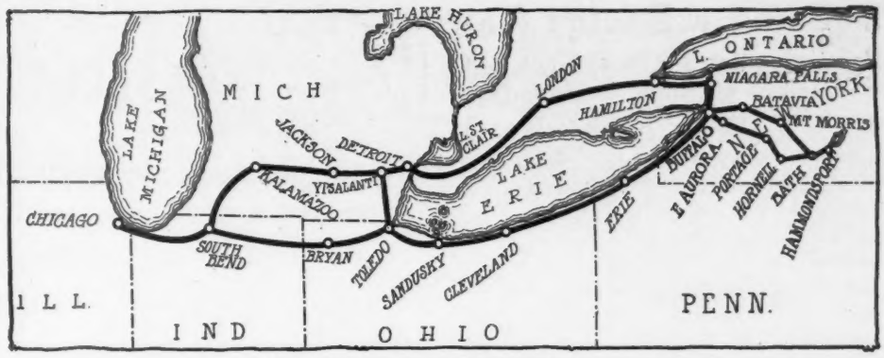
Between Chicago and Madison the towns are Oak Park, Addison, Bloomingdale, Ontarioville, Elgin, Algonquin, Crystal Lake, Ridgefield, Henron, Lake Geneva, Delavan, Emerald Grove, Janesville, Edgerton, Staunton, McFarland, Madison. As far as Lake Geneva the roads are gravel or stone, the remainder gravel or macadam.

The second day go to Baraboo. Visit Kilbourn, more commonly known as the Dells, and return to Baraboo for lunch. Your itinerary lies through Ashton, Sauk City, Prairie du Sac, Baraboo, Lyons, Delton, Kilbourn. Return to Baraboo over the same route, and continue La Crosse via Abelmans, Reedsburg, LaValle, Wonewoc, Union Center, Elroy, Kendalls, Cashton, Portland, St. Joseph. The first part to Baraboo is mostly macadam or gravel.

There are some excellent views en route for Eau Claire touching Onalaska, Midway, Holman, Galesville, Whitehall, Brackett, Eau Claire. Continue through Menominee, Knapp, Wilson, Baldwin, Hudson, Lakeland, St. Paul. It is 10 miles to Minneapolis leaving the state capitol building over University avenue and crossing the Mississippi river over two iron bridges to Hennepin boulevard. Blue Book No. 4 has running directions.

TOURING NEAR HOT SPRINGS

Chicago.—Editor Motor Age—I was in Hot Springs, Va., the last week of May, and noticed how few cars there were in that town despite the quite good roads. Considerable driving is done, but it is not in motor cars. The roads in general are fair, but the many little sharp rocks play havoc with tires. Several streams are not bridged, and they have very rocky bottoms.



VARIOUS ROUTES TO HAMMONDSPORT, N. Y.

Monterey is situated 25 miles from any railroad, and a drive of 40 miles costs $15, taking two good horses 6 hours' time. Staunton to Monterey, 40 miles, can be made by motor car for $4. The road is fair and it is a pleasant trip over three big mountains.

I took a trip in a car operated between Monterey and Durbin, W. Va., which carries the mail and passengers as well. The start out of Monterey is up a long mountain road and down the other side into Crabbottom valley, said to be the finest land in this part of Virginia. The road runs across the valley on a ridge which sheds the water north and south,—north into the Potomac and south into the James river. Numerous fine springs are to be found along these roads.

On the highest point of the mountain is an old post office and the distance from this point into Durbin is 9 miles, practically all down grade. In many places the road is built along the edge of the mountain and ravines, sometimes several hundred feet from the bottom with steep sides where careful driving is very essential. Some magnificent views are had from the road.—C. H. Roth.

PLANS TOUR TO MEXICO

Deport, Tex.—Editor Motor Age—I am contemplating a trip from Dallas to Mexico City, and would like to have the routing.—M. Moore.

Dallas to San Antonio routes through Grand Prairie, Arlington, Handley, Ft. Worth, Crowley, Cleburne, Cuba, Grandview, Itaska, Lovelace, Hillsboro, Abbott, West, Waco, Lorena, Bruceville, Eddy, Troy, Temple, Little River, Sparks, Holland, Bartlett, Granger, Jonah, Georgetown, Round Rock, Fiskville, Austin, Buda, San Marcos, Goodwin, New Braunfels, Selma, and San Antonio. The distance is 348 miles.

San Antonio to Eagle Pass, 146 miles, routes through Castroville, Noonan, Dunlay, D'Hanis, Sabinal, and Uvalde. Sabinas, Mex., is 63 miles distant and is reached by running through Fuente, Rosa, Nava, and Allende. The stretch to Monclova is 106 miles through Aura, Bayos, Lampacitos, Hermanas, Roderigues, and Abasola; Monclava to Bola is 138 miles by way of Bajan, Joya, Espinazo, Reata, Trevino, Sauceda, Jaral, Filipinas, Carmen, Paila, Rafrail and Pozo. Continuing to Torreon, 114 miles you pass through Myran, Hornos, Matamoros.

A road continues through Zacatecas, Aguascalientes, Celaya, San Juan Del Rio and Tula to Mexico City.

This is a very severe test on driver and machine. In 1910 pathfinders were sent out over this road for the purpose of holding a reliability run from Colorado, but it had to be abandoned.

CANADIAN REGULATIONS

A notice in regard to customs regulations is being sent out to the members of the Automobile Club of Canada by the secretary, and is of prime importance in view of the recent holding up of the cars of two Montreal motorists at the border. Attention is drawn to the importance of strictly observing the customs regulations when crossing the international boundary between Canada and the United States. Motorists are required to stop and report at the frontier port in all cases and not at some interior port. The American customs department is now rigidly enforcing this regulation, and the Canadian customs.

It is necessary for motorists to report at the Canadian frontier port when leaving Canada, and at the first frontier port when entering the States; on the return journey the same formalities must be carried out, should the officer not be at his post whether in day time or at night, find him, it will save you trouble later on.

In cases where the tourist intends stopping from 1 to 3 days only in the United States, the officer may use his discretion and waive the requirement of a bond, but for a longer period, not exceeding 6 months, a bond is required, and may be secured at most of the frontier offices. Frontier ports of the principal routes in this section of the province, where motorists are required to stop, are:

Canada.—Lacolle Junction, Noyan Junction, Abercorn, Mansonville, Dundee, Remmingford, St. Armand, Rock Island, Coaticook, Comin's Mills, to July 1; Hall's Stream after July 1.

United States.—Rouses Point, N. Y.; Alburgh, Vt.; Richford, Vt.; North Tray, Vt.; Newport, Vt.; Ft. Covington, N. Y.; Moore's Junction, N. Y.; St. Alban's, Derby Line, Island Pond and Beechers Falls, Vt.

The Readers'

Construction of Speedster Calls for Special Design—Proper Sizes and Lift of Inlet and Exhaust Valves—Formula for Figuring Piston Length—Ways of Oiling Compared

Building a Racing Car

Pennsylvanian Wants Sizes and Designs of Motor for Speeding Purposes

YORK, Pa.—Editor Motor Age—I have under construction a four-cylinder car which I propose using for speed purposes. The motor is four-cycle, has a bore of 4 3/32 inches and a 5½-inch stroke. The valves have 2 1/16-inch opening, and the valve lift is 7/16-inch. The timing I am considering for this motor is as follows: The intake valve opens 15 degrees after the top center and closes 35 degrees after the bottom center; the exhaust opens 55 degrees before the bottom center, and closes 5 degrees after the top center. Is the lift of the valve and the timing of same proper to get the greatest amount of speed of this size motor?

2—What should the length of the piston be, and what clearance should the pistons have in the cylinders?

3—Are oil holes in the piston an advantage or disadvantage?

4—The flywheel weighs 102 pounds including the clutch; the outside diameter of the flywheel is 18 inches, and it has a face of 4¾ inches. Could the weight of the flywheel be decreased?

5—Are 34-inch tires as safe for speed on a mile dirt track as 32-inch?

I propose building a six-cylinder car with the same size bore and stroke, if the four-cylinder car works out satisfactorily.—J. Pierce.

1—The timing which you mention for the intake valves is approximately correct and agrees with average American practice. The exhaust valve timing, however, is somewhat early, although it is difficult to lay down any hard and fast rule for these figures, since much depends on the design of the motor. In average American practice, the valve timing is as follows:

INLET VALVES.

Open 14.7 degrees crank angle late
Close 35.4 degrees crank angle late
Average opening, 200 degrees

EXHAUST VALVES.

Open 45.3 degrees crank angle early
Close 10.3 degrees crank angle late
Average opening, 236 degrees

The valve lift of 7/16-inch is correct.

2—Average practice for American cars has brought out the following empirical formula for figuring the length of piston:

Length in inches=1.14D,

in which, D=cylinder diameter in inches.

Applying this formula to your case, the piston length works out to be 4.74 inches. This could possibly be made 5 inches, if desired.

Pistons are designed with a slight taper, that is, they are made slightly smaller in diameter at the top than at the bottom. This is because the greatest heat and hence the greatest expansion is at the upper end. This must be allowed for. The clearance at the top should be .012 inch and at the bottom .007 inch.

3—As to the drilling of oil holes in pistons, authorities disagree. For high-speed work, there is undoubtedly some advantage in including them in the piston design, since they furnish additional lubrication to the outer piston face and the cylinder wall. Every precaution must be taken to guard against piston seizure, which is made more possible through the continued high speed and consequent heating to which the piston and cylinder are subjected in the racing car. The argument might be advanced that the use of such oil holes, when placed in the upper part of the piston, affords a means of escape for the gases, and hence loss of compression. Experienced drivers seem to favor the use of oil holes, however. If you will submit a sketch showing where you contemplate locating the oil holes,—near the top or at the bottom—Motor Age will be able to answer this question more intelligently.

4—You do not mention the weight of the clutch, so that it is impossible to tell what your flywheel weighs. If the clutch is of the average type, an 80-pound flywheel will meet with the requirements of the engine.

5—Use 34 by 4½-inch tires.

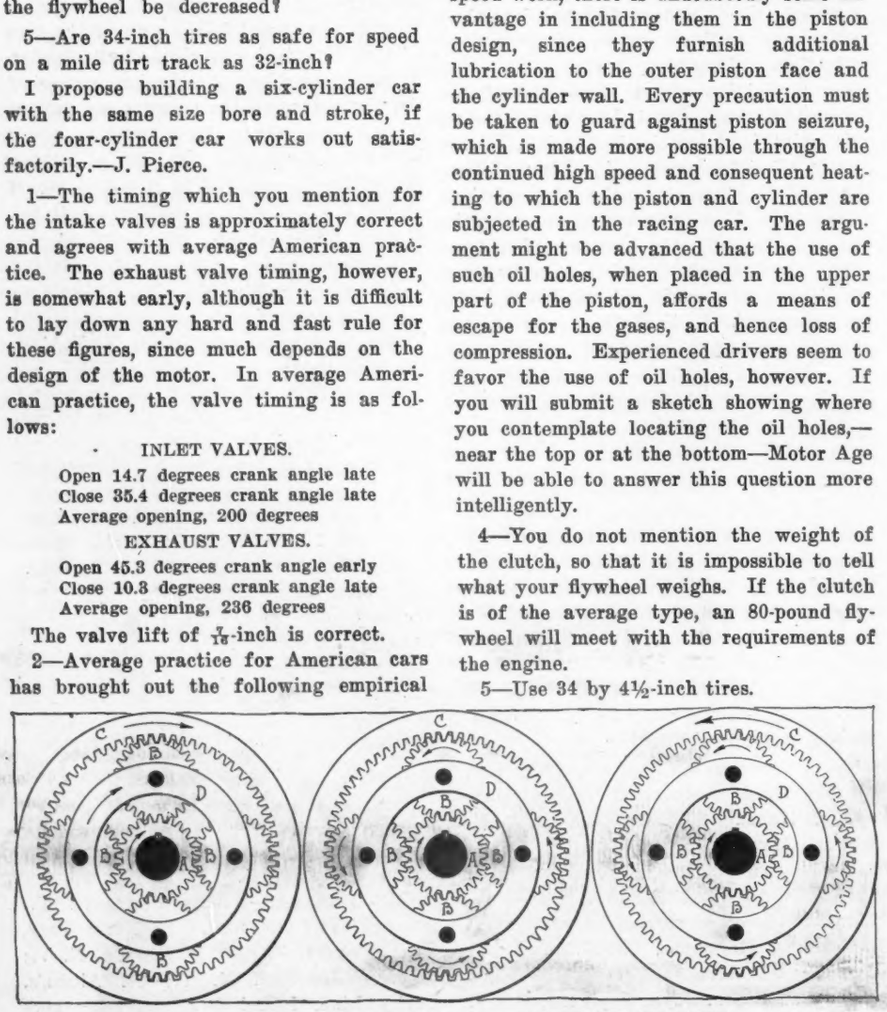


FIG. 1—SPEED COMBINATION OF PLANETARY GEARSET

Methods of Lubrication

Splash System of Oiling Versus Feeding With Fuel—Advantage of Scavenging

COX' CREEK, Ky.—Editor Motor Age—What are the advantages and disadvantages of the splash system of lubrication?

2—Is there any advantage in putting lubricating oil in the gasoline, and are any motor car engines so lubricated?

3—If all the exhaust could be forced from the cylinder with pure air, would it help in any way to ignite or give power to the new charge of gas?—O. J. C.

1—The chief advantages of the splash system of lubrication are its simplicity and inexpensiveness. The chief disadvantages are that the amount of oil supplied to the cylinders usually decreases as the motor speeds up, whereas the amount of oil should be increased. This is because at high speeds the oil does not have time to settle to its level before the connecting rods come around again and they do not dip enough oil. In some motors this is compensated for by lifting the oil trough as the throttle is opened or as the engine speeds up.

2—Yes; this simple method works well in some motors, especially two-cycle ones. The American motors for 1912 in which the oil is fed with the fuel are the Atlas, Dispatch, Duryea and Motorette.

3—Yes; it would provide a mixture unweakened by the inert burned gases.

NEW PISTON REMEDY

Seward, Neb.—Editor Motor Age—How can one test the strength of magnets on magnetos?

2—How many dry cells will I have to use to charge permanent magnets with an electro-magnet?

3—How can one prevent too much oil in the two forward cylinders? The crankcase has a circulating pump that pumps the oil from the subcase into the front end of the crankcase where it flows back into the rest of the case. The motor is a model 17 Buick.—Subscriber

1 and 2—Answered in Reader's Clearing House, Motor Age for June 20.

3—This is caused by worn pistons. It is possible that new rings will help but the chances are that new pistons are necessary.

Clearing House

Why Gearset Slips from High into Neutral—Advantages of Platform Spring Suspension—Proportions of Graphite—Allowable Alterations in Cars

Usual Gas Tank Pressure

Contents of Acetylene Container Little Affected by Changes in Outside Temperature

MONTEZUMA, Ia.—Editor Motor Age—What pressure should a fresh Prest-O-Lite tank register at from zero to 110 degrees above, by the thermometer?

2—How much graphite should be added to a gallon of cylinder oil for proper use in the splash system on the E-M-F and Flanders?

3—Would someone who has had experience with the Wonder Button burner tell me the merits of the same?

4—Would some reader tell me the best vulcanizer to buy, other than electric, for an owner's private use, which would cost less than $15. What has been users' experience with these small vulcanizers?—W. E. McKee.

1—The Prest-O-Lite tank has a pressure of from 210 to 250 pounds per square inch when fresh and before any of the gas has been allowed to escape. The outside temperature has very little effect on the pressure within the tank. There is a slight expansion of the contained gas in hot weather and a contraction in cold, but this difference is not noticeable on the pressure gauge.

2—Finely pulverized graphite may be added in the proportion of about one teaspoonful to the pint of lubricating oil. The two should be very thoroughly mixed. In using graphite in this way, care should be exercised in getting the variety which is prepared especially for this purpose, several brands of which are on the market. There are also prepared lubricating mixtures to be had to which the graphite has already been added.

4—The small vulcanizing outfit is a very valuable apparatus for the private owner who does his own tire repairing. Such outfits may be had at a cost of from $10 to $30.

SLIPPING GEARSET CAUSE

Sylvania, Ga.—Editor Motor Age—While passing through a very deep creek with my Hudson 20 in low with the motor running very rapidly, it suddenly stopped with a pound which cracked the jaws which fasten the rear cylinder to the crankcase; it also cracked the crankcase. Is it possible, or probable, that the crankshaft is bent, since the motor was very noisy upon starting?

2—If so, what should I do?

3—My Hudson is geared 3½ to 1 in high speed and is capable of showing 50 miles per hour. If I should change to 3 to 1, about what ought it to show?

4—Sometimes while running in high speed, the gear lever suddenly jumps in the neutral position. What causes this?—George H. Hilton.

1—It is quite possible that the crankshaft was bent, although the noise might be due to loosened bearings.

2—Send crankshaft to factory.

3—Sixty miles per hour if motor develops sufficient power to turn over under the new conditions at as high a speed as its present maximum. Since the new gear-ratio means that the engine must drive the car farther at each revolution it must have some reserve power.

4—The jaws of the direct drive may be worn so that they slip out of mesh. Or any of the connections may be loose between the lever and the gearset. A general tightening up of the gearshift control connections may relieve the trouble permanently.

ADVANTAGE OF PLATFORM SPRING

Des Moines, Ia.—Editor Motor Age—Does the Cadillac company make its own chassis frames?

2—Since what year have the Clark-Carter people made the Cutting car?

3—Of what advantage is the platform type of suspension over the others?—Isaac Ginsberg.

1—Yes.

2—Since 1909.

3—The platform type of spring suspension gives a greater effective length of spring with what is claimed to be easier riding qualities.

Stock Chassis Changes

Options Allowed by American Automobile Association in Stripped Chassis Events

BRENHAM, Texas.—Editor Motor Age—Will Motor Age please tell me through the Readers' Clearing House just what changes are permitted to be made on a stock car and still have it entered in a A. A. A. stock car race.—A Reader.

No changes are permitted on entries in stock car events. Entries in stripped stock chassis events, according to the 1912 rules are permitted the options listed below:

Lighter springs (number of leaves optional; thickness, width and length must be standard).

Piston diameter may be lessened (form of rings and number oil grooves, etc., must be standard).

Angle of steering post.

Length and angle of change gear, brake and other control levers (method of control must be standard).

Driving gear ratio, wheel diameters excepted. (Where a gear ratio is changed on a shaft driven car, any gear ratio may be used of which the standard axle construction will permit.)

Tire and rim equipment (not demountable wheels unless regularly supplied as standard).

Length of clutch, brake, accelerator and other pedals.

Body equipment: contour of dash, seat and body optional, but floor boards must be carried. (See dash requirements.)

Form, volume and location of fuel and oil tanks (system employed in either case must remain unchanged).

Exhaust header and exhaust pipe (optional, except exhaust must be conducted outside the bonnet and so directed as not to raise dust).

Use of shock absorbers.

Winding of springs only (winding of manifolds, fuel and water pipes or electrical connections must be standard).

Bonnets must be carried throughout a contest, but may be cut away at the side for the passage of exhaust pipes only.

Bonnet straps must be added and approved by the technical committee.

Special wheel fenders or radiator pro-

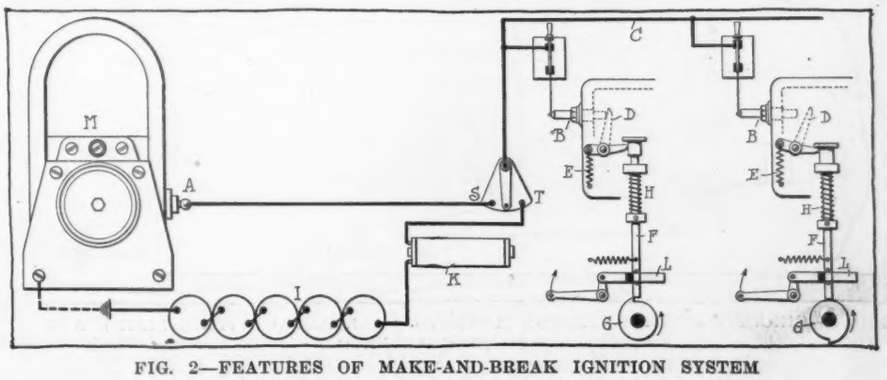


FIG. 2—FEATURES OF MAKE-AND-BREAK IGNITION SYSTEM

tectors of any design may be used, wind shields excepted, provided they are attached to the car in a manner satisfactory to the technical committee.

Note on lubricaton—Where a reserve oil supply is provided, a pipe connection with hand-pump may be employed to transfer the lubricant to the standard oil receptacle regularly supplied by the manufacturer with the car, but in no instance will it be permitted to connect a reserve oil supply directly with the parts to be lubricated unless standard.

Dash Requirements—In a stripped stock chassis the contour of the dash outside of the limits of the bonnet is optional, but the dash arrangements within the limits of the bonnet contour must be in accordance with the regular stock models; standard stock car dash equipment must be carried thereon and it shall not be cut away for the passage of air or for access to the working parts of the motor in any way which does not conform to the regular stock model.

Additional Parts to Chassis—Dash, seat, body, tank or other permissible equipment—shall be of substantial and safe construction within the approval of the technical committee of the contest board.

TWO-BEARING CRANKSHAFT

Cherokee, Ia.—Editor Motor Age—Was the early Rider-Lewis type a good engine?

2—What does Motor Age think of a two-bearing four-cylinder crankshaft? Are they liable to brake?—J. M. S.

1—The fact that the maker of the Rider-Lewis car abandoned the Rider-Lewis engine in favor of one of the standard makes would seem to show that the early type was not satisfactory.

2—Two-bearing crankshafts in four-cylinder motors make a shorter and lighter motor and permit the use of monoblock castings. There is little chance of breakage if correctly designed.

High and Low-Tension Ignition Systems

Difference Between Low-Tension Magneto and Low-Tension System Explained—Operation of the Make-and-Break Spark Arrangement—Two-Bearing Crankshafts

URBANA, Ill.—Editor Motor Age—Kindly give me an illustrated wiring diagram of the Splitdorf dual ignition system, such as used on the E-M-F 30, showing what wires are grounded and where, also indicate the flow of the current by arrows.

2—How can the Ford magneto run in oil?

3—What is meant by the low-tension or make-and-break. Is the make-and-break used on one system and the break on another?

4—What is meant by high-tension or jump-spark ignition? I understand the jump-spark is used with low-tension magnetos.

5—Would like an illustration of the Ford planetary gear, so I will understand it.

6—What kind of an examination does one have to pass to obtain a chauffeur's license?—A Reader.

1—This was illustrated and explained in these columns of the issues for February 22 and June 6.

2—The windings of the magneto in the flywheel are protected from the oil by the insulation which is baked into them.

3 and 4—In a make-and-break ignition system the spark of the cylinder is made by actually closing and opening the circuit at the point of the spark, so that on the break of the circuit, as the terminals move away from each other, the current is drawn across the increasing gap. Since the current does not have to break through the resistance of the spark gap all at once, as is the case with the more familiar jump-spark system, the tension or voltage need not be so high. Consequently, a current of low tension is used instead of the high-tension current employed in the latter.

The arrangement for make-and-break ignition is shown in Fig. 2. The system comprises a current supply, either magneto or batteries, a primary induction coil when batteries are used, a switch for breaking the circuit, and the igniters. The illustration shows the system with both magneto and battery applied to two cylinders of an engine. One terminal of both the battery and magneto is grounded, the other terminal A of the magneto M is connected to the point S of a three-way switch. The ungrounded terminal of the battery is connected to the induction coil K and thence to the point T of the three-way switch. A conductor C connects the third point of the switch to the stationary or insulated electrode of each igniter. The movable electrodes and the metal of the cylinders furnish the ground return for the current. The movable electrode is operated by a camshaft.

The difference between a high and a low-tension magneto is that a high-tension magneto is a complete apparatus from which a high-tension current can be obtained; while a low-tension magneto is a machine from which, without the aid of a separate auxiliary coil, only a low-tension current can be gotten. Both high and low-tension magnetos are commonly employed in jump-spark ignition systems which require a high-tension current; and where low-tension magnetoes are employed an auxiliary induction coil is generally provided on the dashboard of the car. A comparison of the two wiring diagrams shown in Figs. 3 and 4, one of which is high-tension and the other low-tension, will aid you, perhaps, in learning the difference between the two types of magnetos; all features of both diagrams included within the line L being incorporated in the magneto. In the Bosch high-tension magneto, Fig. 3, the armature has both a primary winding, indicated by the heavy dark lines, and a secondary wiring indicated by light lines; the primary winding being made up of comparatively few turns of coarse wire and the secondary of a great many turns of very fine wire. In the Remy low-tension magneto systems, Fig. 4, there is but a single primary winding C in the magneto, the induction coil and condenser being contained in a separate wooden coil-box to which the switch and push-button are attached. As for the

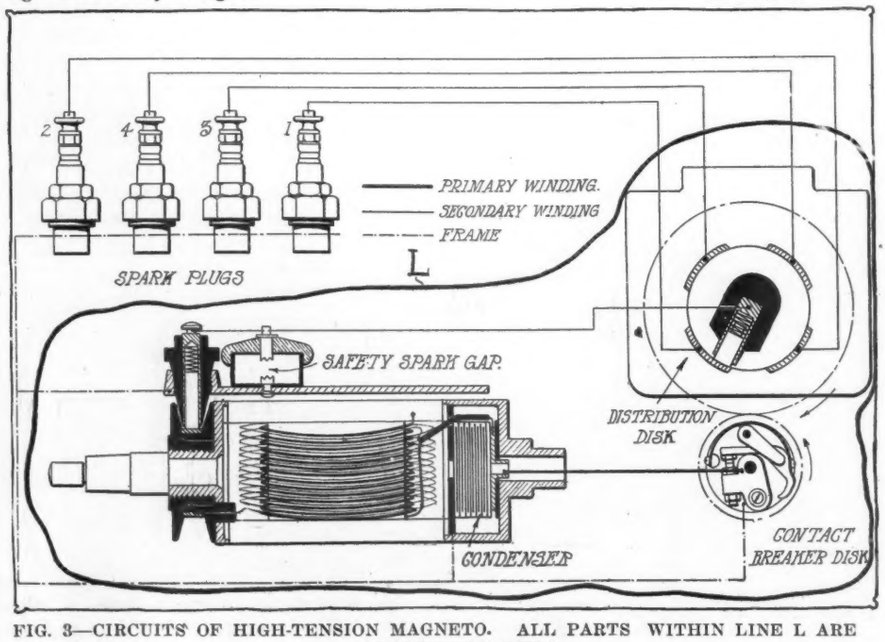


FIG. 3—CIRCUITS OF HIGH-TENSION MAGNETO. ALL PARTS WITHIN LINE L ARE PART OF MAGNETO

Pertinent Questions on Ford Model T

Why Flywheel Magneto Can Run in Oil—Illustration and Explanation of Planetary Two-Speed Gearset—Gasoline Fire Extinguishers—Vulcanization of Tires

entire ignition systems complete, both are of the high-tension jump-spark type.

5—In the three views of Fig. 2 the principle and construction of a planetary gearset which gives two forward speeds and reverse, is illustrated. These illustrations show four pinions, while the Ford gearset has three, but the principle is the same. In all the diagrams the pinion gear A is keyed to the engineshaft, the internal gear C is an integral portion of a drum which is loosely journaled upon the engineshaft and between the pinion gear A and the internal gear C there are four pinion gears B, in mesh with the gears A and C, that revolve on stubshafts attached to a spider or flange which is loosely journaled upon the engineshaft. The sprocket to which the driving chain of the car is attached is rotably attached to this spider or flange.

At the left is shown the direction of rotation of the various gears on low speed. The gear A revolves at motor speed in the direction indicated by the arrow upon it; the gears B being the same size, turn at the same speed in the opposite direction. The drum containing the internal gear C is held stationary; thus the spider or flange D, supporting the gears B, revolves in the same direction as the gear A, but as much slower as the difference between the number of teeth upon one of the gears B and the internal gear C.

Second or high speed is indicated in the center. By means of a clutch device, not shown in this illustration, the drum and gear C and the gear A are locked together, so that the gears B are held stationary between them, that is, they do not revolve on their own axes, but the whole outfit moves as a single compact unit, and the spider D revolves at crankshaft speed.

The reverse, at the right, comprises an entirely separate set of gears in which the drum carrying the integral gear C is connected to the driving sprocket, instead of the spider D, as in the set described above, and a means is provided whereby the drum supporting the gears B can be held stationary. Therefore, when the drum D is held stationary, and the gears A and B revolve as indicated by the arrows, the internal gear and its drum revolve in an opposite direction to the one on the engineshaft, and reverse speed is obtained.

GASOLINE FIRE EXTINGUISHERS

Orient, S. D.—Editor Motor Age—Kindly tell me the formula for dry powder gasoline fire extinguishers. Many cars suffer from slight or total destruction from gasoline fires on our prairies. These powder fire extinguishers seem to put the fire out promptly.—A Reader.

Three formulas are given below, which are equally well recommended.

1—Potassium nitrate, 60 ounces; sulphur, 36 ounces; charcoal, 4 ounces; colcothar of rouge, 1 ounce. Powder separately, dry, and mix.

2—Sodium Chloride, 4 parts; sodium bicarbonate, 3 parts; sodium sulphate, 1 part; calcium chloride, 1 part; and sodium silicate, 1 part.

3—Sodium chloride, 3 parts; ammonium chloride, 3 parts; sodium bicarbonate, 4 parts.

REPAIRING TIRES

Magnum, Okla.—Editor Motor Age—What is the correct way to splice an inner tube, vulcanizing or by acid cure cold process?

2—What is the best material to be used between the rubber and vulcanizer to keep the rubber from sticking?

3—How long should a casing be left in a steam vulcanizer after being prepared, as illustrated in a recent issue of Motor Age, and what steam pressure should be maintained?

4—Is one heat sufficient to vulcanize fabric together and cure tread? How much pressure should the air-bag contain? —Amateur.

1—By the acid cure cold process.

2—Thin cloth is satis actory.

3—A casing should be left in the steam vulcanizer from 40 to 50 minutes, after preparation, with 50 pounds steam pressure for ordinary sizes, and a trifle more for larger sizes.

4—Yes, although a better job could be made of it if the fabric were semi-cured at low pressure, then building up the gum with another short cure. The latter method should not be employed by other than one thoroughly experienced, because of the danger of burning the fabric and ruining the tire.

CYLINDER SIZE AND WEIGHT

Bennett, Ia.—Editor Motor Age—Which is the better, a unit power plant, or the transmission detached from the motor and located amidship?

2—Also, which is the preferred type, cylinders cast en bloc, in pairs, or single?

3—How large should the cylinders be in a car weighing from 3,000 to 4,000 pounds?

4—Which type of motor is considered the best, that with cylinders 4½ by 4½ inches, or 4½ by 4¾ and up to 6?—C. Rohlf.

1—Authorities disagree as to the best location of the gearset. There are good cars employing unit power plant, others, equally as good with gearset detached from the motor and located amidship, still others of the same standing place the gearset on the rear axle.

2—Of the 381 chassis models of American cars for 1912, seventy have the en bloc motor, 220 have cylinders in pairs, eight-two have cylinders cast separately and nine in threes.

3—They should have a cylinder volume of from 260 to 430 cubic inches, that is, if a square motor, the bore should be from 4⅜ to 5 inches in a four-cylinder. Average cars rate at 1 horsepower per each 104 pounds.

4—The motor with its bore somewhat greater than the stroke seems to be more in favor.

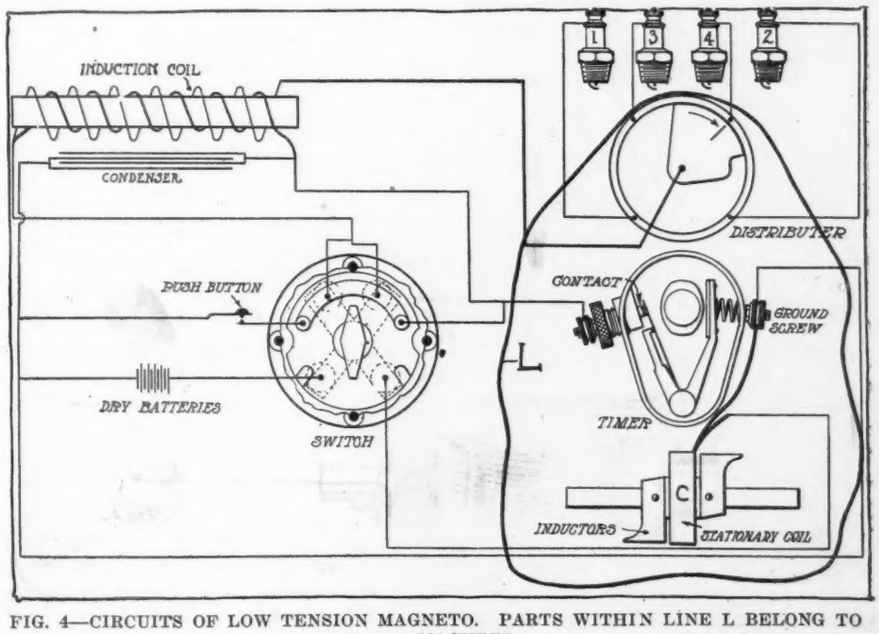


FIG. 4—CIRCUITS OF LOW TENSION MAGNETO. PARTS WITHIN LINE L BELONG TO MAGNETO

Method of Brake Capacity Determination

A CAR starts under the power of the motor; overcoming a certain resistance it begins to move. The cause of this movement is the action of unbalanced forces; power is in excess of resistance. Meanwhile the motor is getting up to full power and speed, and the car begins to accelerate. That is to say, at each interval of time the velocity is higher in value than at the beginning of the time interval. In the early part of acceleration the force necessary to produce acceleration is equal to the product of mass and acceleration. This could be safely taken as constant up to the velocity of ten miles per hour. Reaching this velocity, the resistance will begin to increase with the intervals of velocity; that is, the resistance at the beginning of the velocity interval will be smaller than at the end of the interval. This increase in the resistance naturally requires an increase in the power output of the motor. If we investigate the power characteristic of a motor, we find that the maximum horsepower is generally reached at 1,000 feet per minute piston speed. As soon as we reach this point, the further increase of velocity is possible only if resistance decrease. Motor output = resistance; under such condition the car will travel with constant velocity. During acceleration, the car accumulates potential energy, due to its mass velocity; this is a capacity for overcoming a resistance:

$$\frac{G}{g} \times \frac{V^2}{2}$$

Work of Brake

If we wish to bring a moving car to rest, we have to consume this energy. A brake is an energy consumer. The most simple known way of consuming energy is by friction. In mechanics we term friction as the product of vertical pressure and friction coefficient.

EDITOR'S NOTE—Paper read by S. I. Fekete before the Society of Automobile Engineers at the summer meeting of that body at Detroit, June 27

In a given material the molecules are grouped together with a potential force. That is to say, each molecule will resist outside forces which tend to change its location or to separate it from the system of molecules. The contact surfaces of two materials placed together under a given pressure will deflect into each other. If we change the relative position parallel to the surfaces, certain molecules will break away and the force which retained them in the material will be set free. This force we observe as heat.

Friction Resistance

The force which was necessary to move these surfaces under pressure is the friction resistance. The friction coefficient multiplied by the vertical pressure gives the friction resistance. Consequently the friction coefficient characterizes the material in respect to its molecular structure, deflection into other materials and molecular potential energy. This friction coefficient will change if we change the temperature of the body, because thereby we disturb the molecular potential energy. Further, it will change if we introduce materials between the surfaces. This will disturb the quantity of deflection of the surfaces into each other. Wear of matter is the consequence of small particles being separated.

The physical duty of a brake is to turn superfluous energy into heat. The capacity of a brake to transform kinetic energy into heat units in one second is equal to the heat equivalent of the work unit, multiplied by the surface, by the friction coefficient, by the pressure on the unit surface, and by the velocity of unit distance per second, or in equation:

$$Q = A \times S \times U \times P \times W$$

Q = total heat in thermal units.
A = heat equivalent of unit work.
S = friction surface in unit.
U = friction coefficient.
P = vertical pressure on unit surface.
W = velocity in second.

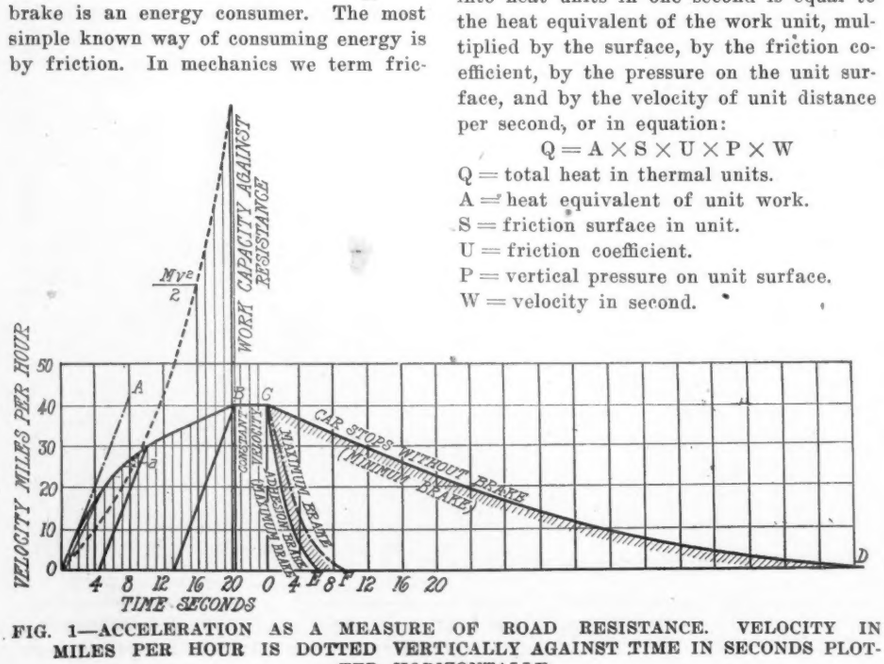


FIG. 1—ACCELERATION AS A MEASURE OF ROAD RESISTANCE. VELOCITY IN MILES PER HOUR IS DOTTED VERTICALLY AGAINST TIME IN SECONDS PLOTTED HORIZONTALLY

If a wheel rim with an axle pressure could roll on a surface without any deflection, such a condition would be rolling without resistance. A wheel rim under the pressure of the axle is deflected into the ground and leaves a path. The quantity of work required to make the path of interval length in an interval of time is the measure of work consumed by resistance.

Road Resistance

In Fig. 2, C represents the method of action of the resistance. In A if we imagine the ground resistance concentrated at the point a, then to make resistance and effort equal would require the following balance:

$$B \times m_1 = A \times m$$

B = the effort of resistance.
m = the lever of resistance.
W = weight of car.
A = the actual effort of the car, produced by the two components of P and W.

From this we see that r, radius of wheel, must be taken into consideration, because resistance is a function of the radius, of the weight, of the velocity, of the axle pressure and of two constants, one of the latter varying with the velocity. To illustrate the influence of radius shown in B, taking the same weight W and the same component P,

$$A \times m > B \times m_1$$

From these many variable quantities, we can readily see that determining road resistance by any approximate formula or by any values given by tables taken from experiments made on a certain car is a very uncertain method.

During the designing of a motor car, it is very advantageous to know the accelerating condition, as giving data of the resistance variation at different speeds. Such a curve assists in fixing the gear ratio, because this is a function of both the resistance and the motor characteristic. Furthermore, it gives sufficient information as to the necessary brake capacity of the car.

The Speed-Time Curve

The speed-time curve, Fig. 1, merely illustrates the acceleration and retardation of the car. It is not necessary for brake calculation. It is plotted so that the time integral is distance traversed. In Fig. 1 tangent O A, to the speed-time curve, is the acceleration with constant force and resistance.

Force = Mass × Acceleration

O B is the acceleration or speed-time curve. This is plotted so that the change of resistance with constant force in the time interval will produce a variable acceleration a. When the car reaches a velocity of ten miles per hour, we may assume that the motor will develop normal horsepower; meanwhile, the motor develop-

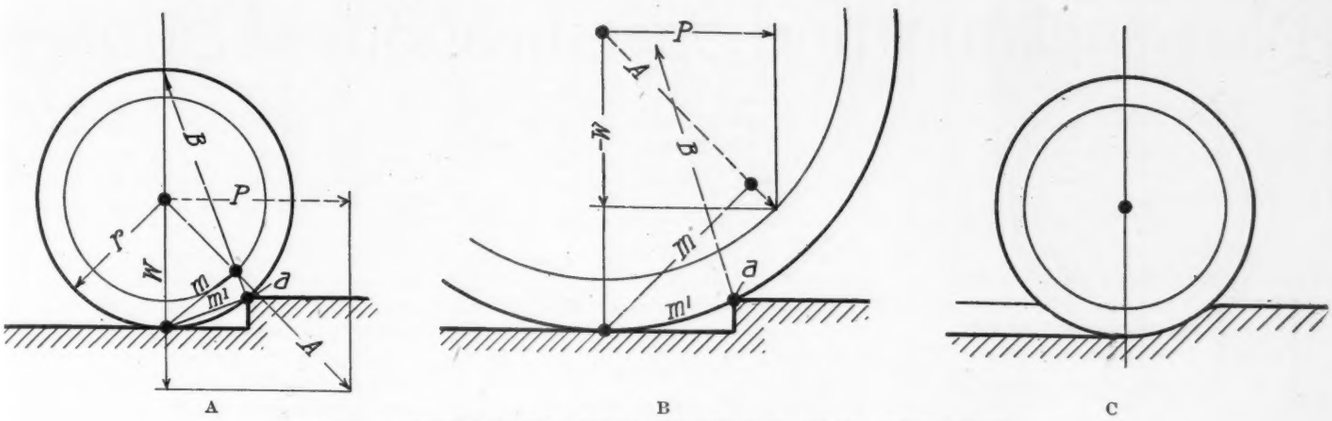


FIG. 2—ILLUSTRATING THE CALCULATION OF ROAD RESISTANCE

ing full horsepower, the car begins to accelerate. During the early part of acceleration the power is in excess of resistance. This excess unbalanced power will cause acceleration. At a certain velocity the car reaches a constant velocity. The velocity is on the line B C. While reaching this velocity, the car accumulates an energy which is capable of acting against retarding resistance before being brought to a rest. The capacity of this work equals the energy which was used to bring the car from the state of rest to this actual velocity. The value of this work is

$$M \times \frac{v^2}{2} \text{ foot-pounds}$$

At the moment when we disconnect the motor we will have a resistance which will retard at the rate C D. This being the action of the smallest resistance the travel will be the longest; it will take the longest time to consume the energy had when disconnecting the motor. This action of resistance we call the minimum brake effect.

Maximum Brake

The possible maximum braking effect on a car is the locked condition of the wheel. In such case resistance is equal to adhesion and the rate of retardation is shown by the curve C E in Fig. 2. The requirements of a set of brakes are those shown by a curve near the maximum brake, as indicated by line C F. Between C D E C are all the possible brakes within the limits of brake maximum and brake minimum.

Determination of Minimum Brake

The total resistance to car motion is the sum of air resistance and road resistance. The air resistance $= 0.0303 \times V^2$.

V = velocity in feet per second.

These values are plotted in the curve O A, Fig. 3.

The road resistance may be determined by the acceleration. Suppose the motor develops normal horsepower and a constant tractive force; this will give a straight line G B which represents the tractive force in the diagram of 800 pounds, given by a 25-horsepower motor. Up to the velocity of 14 feet the accelerating force is constant. From point B we may assume a constant tractive force and a constant horsepower output. Therefore curve B B is parallel to the air resistance curve O A.

Between B A

$$\text{Tractive force (HP)} = (\text{force to cause acceleration}) \times \frac{V}{550}$$

$$\text{Tractive force (HP)} = \text{mass} \times \frac{dv}{dt} \times \frac{V}{550}$$

$$\text{Force to cause acceleration} = \frac{\text{(HP) tractive force}}{\frac{V}{550}}$$

where : V = velocity in feet per second.

In Fig. 3 ordinates in the area of B C A will give the resistance due to the velocity.

Area C A E F represents the run with constant horsepower and constant resistance. If in D F E we disconnect the motor, we can plot the curve of the minimum brake by first tracing over the curve of air resistance; to this we give the resistance taken from the other side of the diagram—ordinates between B C A. This line represents the resistance without brake.

To get the distance traversed when the car comes to rest, the following calculations are necessary: Where M equals the mass or weight in pounds divided by 32.2, V equals the velocity in feet per second, N equals the energy required, and R_1, R_2, etc., equal the various resistances respectively.

$$\frac{MV^2}{2} = \text{mean resistance} \times \text{distance}.$$

$$\frac{Mv^2}{2} = \text{foot-pounds energy} = N_1$$

$$\text{Distance traversed} = \frac{N_1}{\text{Mean resistance}}$$

$$\text{Mean resistance} = \frac{R_1 + R_2 + R_3 + \ldots R_n}{n}.$$

The braking effort is the sum of minimum brake plus the action of brakes. The maximum brake is adhesion plus minimum brake.

Conclusion

First—Road resistance can be determined by the acceleration, the power output and the weight of the car.

Second—The ideal braking capacity of a car should be near to the retardation due to locked wheels.

The Braking Resistance

The braking resistance given by the tangential effort of a brake is equal to

$$T \times R = R_e \times R_1.$$

T = tangential effort.

R = radius of brake drum.

R_e = braking resistance.

R_1 = radius of wheel.

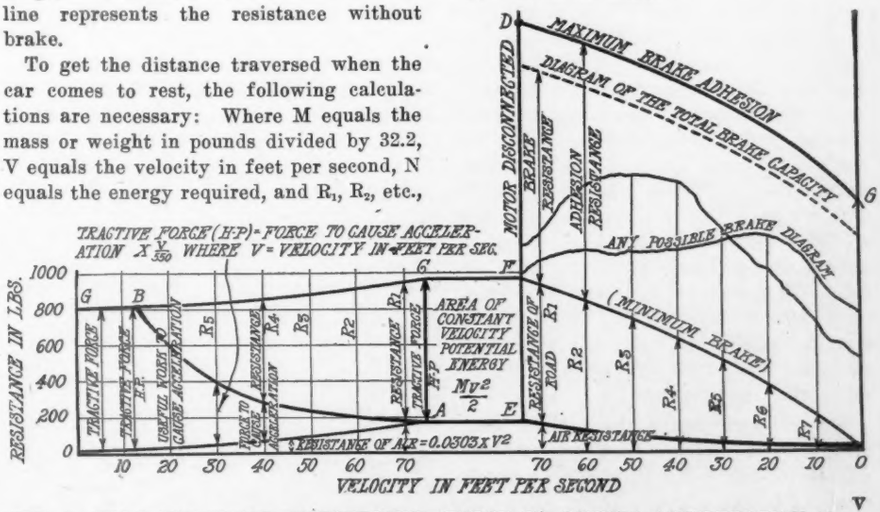
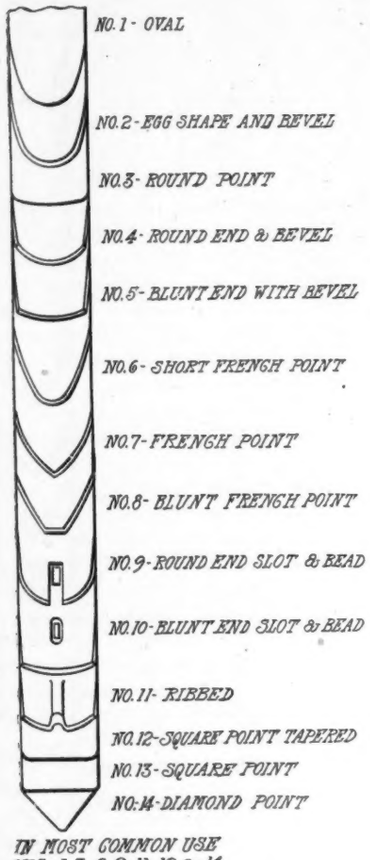


FIG. 3—TRACTIVE FORCE, HORSEPOWER, FORCE TO COURSE ACCELERATION $\times \frac{V}{550}$, WHERE V=VELOCITY IN FEET PER SECOND

Nomenclature and Specifications of Springs



TYPES OF LEAF POINTS

Editor's Note—Third Report of the springs division of the Standards Committee of the Society of Automobile Engineers, presented to that body at its summer meeting at Detroit, June 27. Submitted for discussion.

IN order that the best possible results might be obtained in the work of the springs division, the chairman collected such data as were available from previous reports of the division, the minutes of the discussion recorded on the subject at the last annual meeting of the society and various other sources, and under date of April 16 he had sent through the office of the society a circular letter, together with various exhibits, to the members of the springs division, incorporating recommended changes in leaf spring specification. At the same time a series of blue-print sketches covering suggested changes and recommendations were forwarded to forty or more spring-makers, asking their criticism and advice. To date we have had in the neighborhood of a dozen replies and of these seven answered the questions asked more or less fully. The remainder either preferred to leave the matter in the hands of the springs division or expressed themselves as being unable to give much assistance along the lines requested.

We will first outline the various points of the letter referred to above and enumerate the criticisms on and recommendations as to the same, without going into details.

Exhibit A was a copy of the second report of the springs division of the standards committee. This report was discussed in the January meeting of the S. A. E. and accepted as to specifications for ordering springs.

Under nomenclature one correspondent objected to the term scroll end, it being stated that this was already in common use as meaning the eye at the end of the spring, formed by bending the main leaf around itself, instead of an eye formed by solid welding and drilling. The term shackle end was recommended by the person making this objection.

As to exhibit B, covering spring order specifications, as proposed by the chairman, it was recommended to provide for three different types of eyes:

1. Eyes formed by wrapping main leaf.
2. Eyes formed by wrapping main leaf and other leaves.
3. Eyes formed by solid welding and drilling.

It was also recommended that the committee provide for three different types as regards position of eyes:

1. Eyes looking up.
2. Eyes on plane of spring.
3. Eyes looking down.

It was also suggested that the style of eye be designated separately in each spring, viz:

Front Spring. {Front / Rear} Rear Spring. {Front / Rear}

One writer thought it would be well to neglect entirely the specification outside diameter of bushing equals I. D. plus ¼", and to not attempt to standardize this dimension except for 2" pleasure car springs where he contended a bushing with a 1/16" wall is universally used.

As to exhibit C, covering the various types of leaf points, there was little exception taken. One manufacturer thought a square end would be as serviceable as any of the others and less costly.

Exhibit D was a series of blue-print sketches showing the various types of springs and the different methods of dimensioning the same. Very little criticism was offered on this except that it was advised that in case of all springs the height of both ends of the spring be dimensioned separately and that in those in which the scroll end was incorporated, the length of the scroll shackle should be given.

It was also suggested that a note be placed somewhere on this exhibit to the effect that all dimensions should be given under full passenger or merchandise load.

In addition to the various exhibits there were appended to the circular letter several questions relating to spring shackles, etc., in answer to which there was some diversity of opinion.

Under question No. 1—should spring shackles stand vertically under load—the majority answered in the affirmative. One recommendation was to incline shackles toward the center when the spring is short and high. Another advised vertical position in some cases but inclined in others, depending on whether the spring was in tension or compression, but did not differentiate.

Question No. 2—as to spring clips—was divided into six separate headings designated by the first six letters of the alphabet:

As to a—kind of steel recommended—two advised mild steel and one 0.30 to 0.35 carbon O.H. steel forging. Another advised a special alloy steel only.

As to b—form of thread—the majority favored the S. A. E.; one thought the U. S. S. good enough, while a third recommended carriage thread.

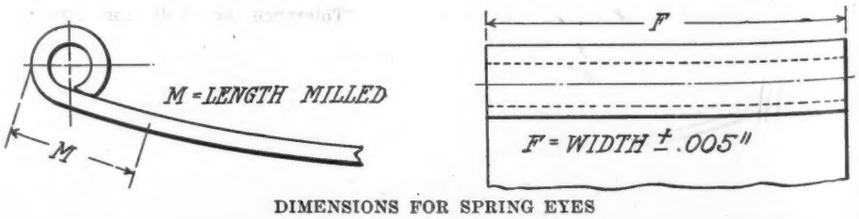
As to c—diameter of shank on spring clip—the following table was suggested:

For 2" spring, ½" shank.
for 2½" spring, ⅝" shank.
for 2½ to 3½" spring, ¾" shank.

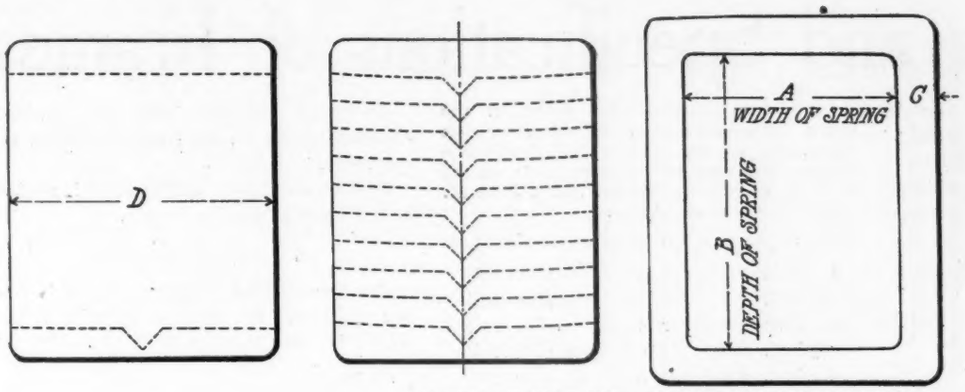
As to d—type of nuts—one manufacturer suggested one hex nut with cotter pin or lock washer or castellated nut with cotter pin; another advised two square nuts, while a third thought a single hex nut without any locking device of any kind sufficient.

As to e—formula for figuring length of spring seat—there was only one formula given. In this W denoted the width of spring. The length of seat was given as being equal to 2¼ W.

As to f—formula for distance between clips—it seems to be the consensus of opinion that the clips should be as close to each other as possible. The question was answered in one case by a formula—distance



DIMENSIONS FOR SPRING EYES



TRUCK CAPACITY	A	B	C	D
1½-TONS			⅜"	2½"
2-TONS			⅜"	2½"
3-TONS			⅜"	3"
5-TONS			½"	3"
BAND MATERIAL			"DEAD" SOFT IRON RECOMMENDED	

CENTER BANDS FOR COMMERCIAL CAR SPRING

between clips equal 1½ W, W being the width of spring.

Question No. 3 called for a formula for determining the size of spring eye-bolts. One formula was given as follows:

$$\text{Diameter of bolt} = \frac{W}{4}.$$

W equals spring width.

Two tables showing various sizes of bolts for different spring widths were forwarded. These compare favorably with each other and are summarized as follows:

For 1½" to 2" spring, ½" bolts.
For 2¼" spring, ⅝" bolts.
For 2½" spring, 11/16" bolts.
For 2¾" to 3" spring, ¾" bolts.
For 3½" spring, ⅞" bolts.
For 4" to 4½" spring, 1" bolts.

After due consideration of the recommendations enumerated above it has been decided by the springs division to make the following recommendations:

Nomenclature

First—That the old-time scroll end be retained to indicate the method of forming that end. The term shackle end seemed to the division to be ambiguous and to convey no definite idea of a scroll effect.

Second—That the term spring clip be adopted to indicate the forging used to fasten the spring to the axle.

Third—That the following fourteen leaf points be known by the respective terms placed opposite them as follows:

Fourth—That the spring clip shank thread be S. A. E. standard.

Fifth—That the dimensions given below of shrunk center bands, which the division has found have been used in some instances, be printed for the information of S. A. E. members.

Specifications for Ordering Springs

Sixth—After careful consideration of the spring order specifications submitted to our last report, it has been decided to make several changes in both the written specifications and in the sketches accommore complete. In the sketches given for dimensioning purposes we have included the spring shackles and shown them standing in a vertical position—under full load—as we think that this is the accepted practice.

SPRING ORDER SPECIFICATIONS

Type of car.....

Type of spring { Front / Rear } See Nomenclature Diagrams in Second report of springs division †

Material .....

Type of leaf points.....

See diagrams (in this report)

Width of Leaf { Front..... / Rear..... / Transverse..... }

Method of clamping spring in center { Bolt / Nibs / Band } See center bolt—second report of springs division* — and shrunk band specification in this report.

Type of Eye { No. 1 Eye former with main leaf. / No. 2 Eye formed with main leaf and other leaf or leaves. / No. 3 Eye formed by welding and drilling. / a. In.* / b. Out.° }

Fill in by number and letter

	Front eye	Rear eye
Front spring.....		
Rear spring.....		
Transverse spring		

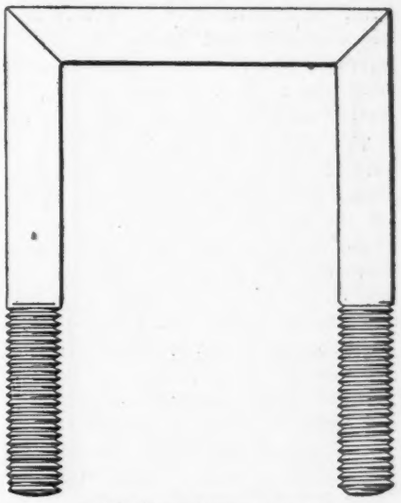
Eyes { Bushed*: Material ..... / Inside diameter .....in / Outside diameter of bushing = I. D. × ¼" } Reamed / Not Reamed
Not Bushed°: Inside diameter...in. } Reamed / Not Reamed

*Tolerance on bushed eyes; 0 to .002" under standard diameter.

*Tolerance on bolt for bushed eye: 003" to .004" under standard diameter.

°Tolerance on eyes not bushed: 0 to .005" under standard diameter.

°Tolerance on bolts for eyes not bushed: .007" to .008" under standard diameter.



STANDARD SPRING CLIP

Rebound Clips Number

Type { Clinched / Bolted }

		On front spring R	On front spring L	On rear spring R	On rear spring L
Weight carried above springs	Car empty.....lbs..	lbs	lbs	lbs	lbs
	With max. load.lbs..	lbs	lbs	lbs	lbs

Distance between two most adjacent parts liable to strike, measured under maximum load..... { Front ...in. / Rear ...in. }

Do springs take driving effort?.....

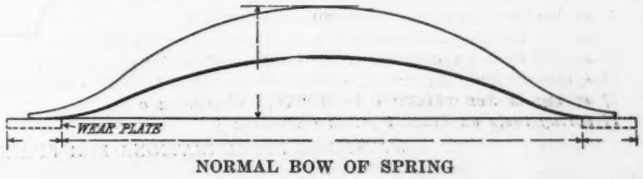
Do springs take braking effort?.....

Shackles—	Front	Rear
Under tension or compression		

To Be Left to the Springmaker

1. Number of leaves.
2. Gage of steel.
3. Type of leaf point.
4. Type of rebound clip.

ARRANGEMENT OF SPRING EYES



NORMAL BOW OF SPRING

Proportions and Specifications of Frames

EDITOR'S NOTE — Third report of the frame sections division of the standards committee of the Society of Automobile Engineers presented to that body at its summer meeting at Detroit, Mich., June 27. —Submitted for discussion.

THE following proportions and specifications are submitted for consideration as recommended practice in frame construction. These figures were arrived at through correspondence and conversation with various people interested. We are indebted to L. R. Smith for a great deal of practical suggestion for various frame proportions. In many instances the figures represent standard practice at the present time, but in some cases the figures do not represent exactly any particular construction, but are composite figures. For instance, a man who is now using a side rail having a front end curve of 13 9-16 inches radius could probably use a 12 or 16-inch radius just as well in designing such a frame over again.

The figures in this report are, to a certain extent, of empiric rather than scientific derivation. The frame is a part of the car into which the element of shock enters so largely as to destroy any mathematical data regarding any theoretical proportions and cannot be figured the way a bridge would be constructed, even though it may act as a bridge when the car is standing on the floor. The attempt to proportion the cross-section of the frame to either horsepower rating of engine, wheelbase of car or number of passengers carried, would be impracticable for best results, although there is a slight relation between the wheelbase and depth of side rail section, and the strength of certain sections may be increased by gage of metal for different conditions.

The following recommended practice is suggested for acceptance:

A—Amount of drop between top of side rail and front spring bolt:

4 -inch drop for 3 -inch side rail
4½-inch drop for 3½-inch side rail
5 -inch drop for 4 -inch side rail
5½-inch drop for 4½-inch side rail
6 -inch drop for 5 -inch side rail

B—Represents radii or curve of bottom flange of side rail at front end:

8, 12, 16, 20 and 24 inch

C—Rear end rise—amount of difference between level of frame at rear end center of side member:

2, 3, 4 and 5 inch

D—Radii of combined curve in bottom flange of side member to make rise at C:

10, 20 and 30 inch

E—Side rail offset to commence at least 10 inches back of rear end of front end taper.

CROSS-MEMBERS

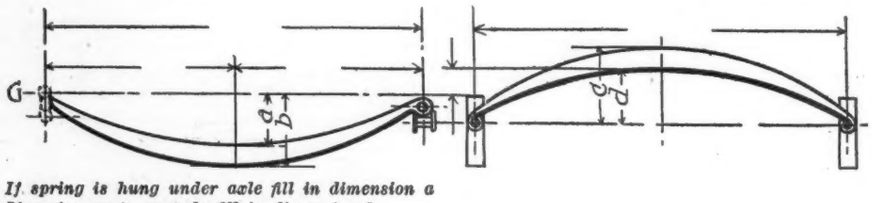
F—Widths of recommended size of gusset plate ends—4, 5 and 6 inches.

G—Radii of curved gusset plates to be 3 and 4 inches. Straight gusset plates to be cut at angle of 45 degrees.

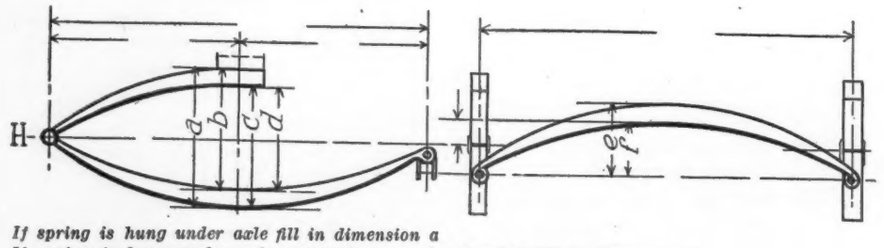
It is considered impracticable to stipulate recommended practice as to shapes of cross-members, due to different radiator designs, etc. Members with straight drops, however, could be made to have drops vary in multiples of ½ inch, adopting a constant angle for the dropped portion.

SUB-FRAME

H—Top of sub-frame to be on line with inner side of lower flange of side rail.



If spring is hung under axle fill in dimension a
If spring rests on axle fill in dimension b
If spring is hung under bracket fill in dimension c
If spring rests on bracket fill in dimension d



If spring is hung under axle fill in dimension a
If spring is hung under axle and is hung under bracket fill in dimension b
If spring rests on axle and rests on bracket fill in dimension c
If spring is hung under axle and rests on bracket fill in dimension d
If spring is hung under bracket fill in dimension e
If spring rests on bracket fill in dimension f

STANDARD SPECIFICATIONS FOR SPRINGS

I—Width between bars for flywheel clearance to be 17, 17½ and 18 inches, respectively.

J—Recommended width of all engine bar flanges to be 1½ inches.

WIDTH OF FRAME

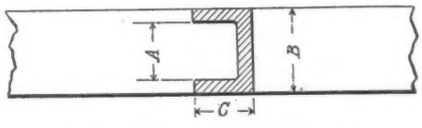
A recommended practice of 30 inches for front end of frame is submitted, the width in rear to vary with the side rail offset.

PRACTICE OF HOT RIVETING

Diameter of Rivet	Diameter Drilled Hole	Spacing Distance Between Centers
⅞ inches	11/32 inches	1½ inches
⅜ inches	13/32 inches	1½ inches

MISCELLANEOUS

It may be possible to recommend a



STANDARD FRAME ANGLES

depth of side rail for a certain wheelbase something as indicated in the following table:

Wheelbase	Depth Side Rail
110-125 inches	4½ inches
125-135 inches	5 inches
135 inches up	5½ inches

Several recommendations regarding the side rail sections and material have already been passed upon by the committee. Later practice, however, suggests certain changes and additions. We therefore submit the following revision for the approval of the society:

SIDE RAIL SECTIONS

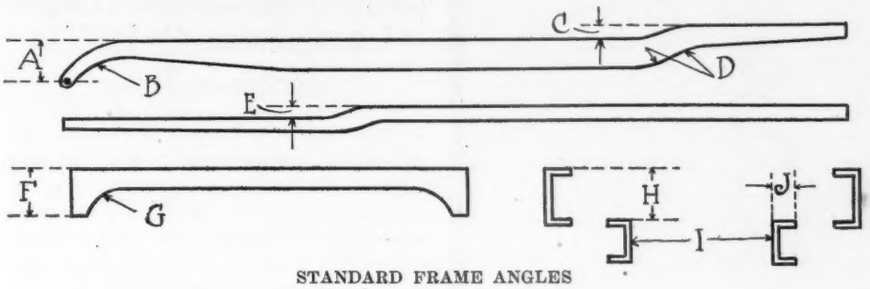
Designation Inches	C—Flange Width Inches	A—Punch Size Inches	B—Using .125 Inches	Variable Outside Dimension Using .156 Inches	Using .187 Inches	Using .250 Inches
3	1½	2¾	3	3 1/16	...	...
3½	1½	3¼	3½	3 5/16	3⅝	...
4	1½	3 11/16	3 11/16	4	4 1/16	4 5/16
4½	1½	4⅛	4⅜	4 7-16	4½	4⅝
5	1¾	4⅝	4⅞	4 11/16	5	4⅛
5½	1¾	5⅛	5⅜	5 7-16	5½	5⅝
6	1¾	5⅝	5⅞	5 11/16	6	6⅛

MISCELLANEOUS

Center sections of side rails to be designed in multiples of 2 inches, depending on the load.

Taper of side rail ends to be 1-16 to 1 inch. This taper, coincident with center sections in multiples of 2 inches will produce a depth of section at extreme ends of side rails varying in multiples of ⅛ inch.

Trade Matters from Eastern Cities



STANDARD FRAME ANGLES

S. A. E. SPECIFICATION NO. 10—30
.30 *Carbon Steel*

Carbon	.25 per cent to	.35 per cent	(.30 per cent desired)
Manganese	.50 per cent to	.80 per cent	(.65 per cent desired)
Phosphorus, not to exceed		.04 per cent	
Sulphur, not to exceed		.04 per cent	

S. A. E. SPECIFICATION NO. 32-25
.25 *Carbon, Medium Nickel Chromium Steel*

Carbon	.20 per cent to	.30 per cent	(.25 per cent desired)
Manganese	.30 per cent to	.60 per cent	(.45 per cent desired)
Phosphorus, not to exceed		.04 per cent	
Sulphur, not to exceed		.04 per cent	
Nickel	1.50 per cent to	2.00 per cent	(1.75 per cent desired)
Chromium	.75 per cent to	1.25 per cent	(1.00 per cent desired)

NEW YORK, July 1—Claire L Barnes, third vice-president and member of the board of directors of the Motor and Accessory Manufacturers, has resigned owing to a series of shifts in the membership in the association. Mr. Barnes has been one of the leading spirits of the organization and it is generally expected that he will soon resume his official connection with the M. A. M. William H. Crosby, of Buffalo, was chosen to fill out the unexpired term of Mr. Barnes as director until January 1, 1914, and S. C. Billings has been selected to take up the duties of third vice-president until January 1, 1913.

The following concerns were elected to membership in the organization: Hood Rubber Co., Boston, Mass.; Lefever Arms Co., transmissions and jackshafts, Syracuse, N. Y., and the American Hardware Corporation, Corbin Screw Corporation, machine screws, New Britain, Conn.

MILES WILL ENTERTAIN N. A. A. M.

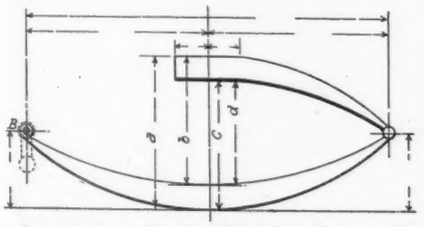
New York, July 1—Instead of holding regular meetings in July and August, the National Association of Automobile Manufacturers will combine the two meetings and hold the joint session at Christmas Cove, Me., the summer home of Samuel A. Miles, general manager of the organization. The meeting is scheduled for July 30 and will be attended by practically the entire board, together with several members of the Motor and Accessory Manufacturers and a few officials and guests from headquarters.

Indefinite postponement has been taken as far as the convention of sales managers is concerned. The convention was originally planned for the next week, but owing to the press of late business and preparation for the 1913 season it was found inadvisable to hold the convention until later. According to announcement made by the Automobile Board of Trade, the convention will probably be called for September. The regular monthly meeting of the A. B. of T. will be held July 11.

CONDITION OF RUBBER MARKETS

New York, July 2—Special telegram—A firmer tone was apparent in the crude rubber markets of the world during the past week. Trade in New York has been of small proportions and most of it was for prompt delivery. A slight hardening of prices was felt and the current level is on a basis of $1.12½ for up-river fine Para rubber.

At the London fortnightly auction, which is scheduled for the first and third Tuesdays of each month, the offerings include 580 tons of plantations. This is considerably less than was expected. Not including Tuesday's auction, the offerings of plantation grades so far this year have amounted to nearly 3,000 tons more than last year during the corresponding period.



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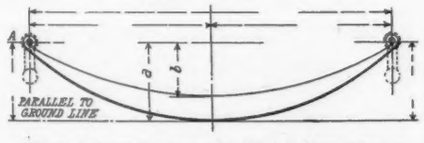

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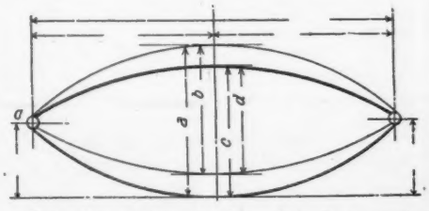

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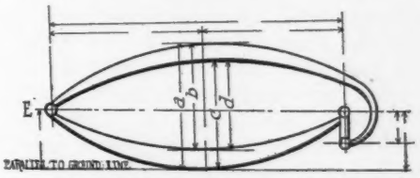

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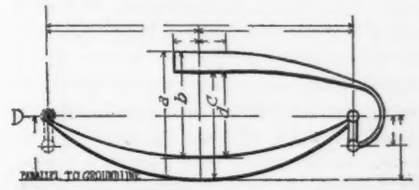

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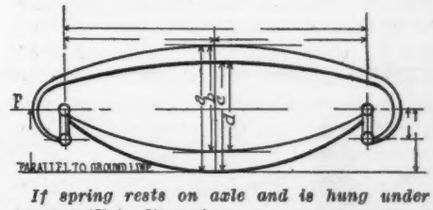

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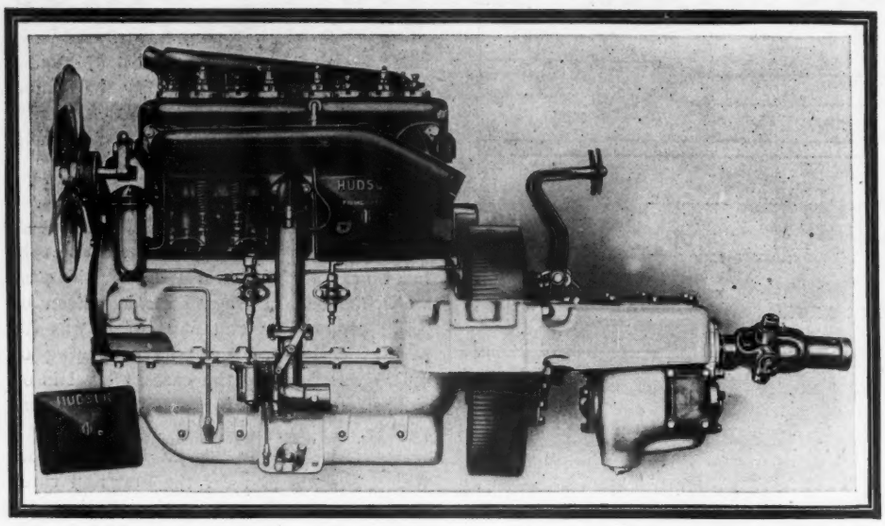
If spring is hung under axle and rests on bracket fill in dimension d

DIMENSIONS TO BE SPECIFIED IN SPRING ORDERS

Hudson Model 37 Has Larger Motor

Latest Four-Cylinder Engine Has Cylinders 4⅛ by 5¼ Inches in Size

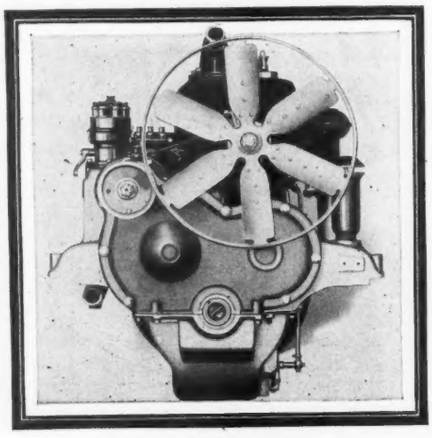


VALVE SIDE OF NEW UNIT POWER PLANT OF HUDSON

HUDSON motor cars for the season of 1913 differ radically from any previous products of this factory. Of greatest interest in the announcement for the coming season is the statement that a six-cylinder car will be put on the market in a short time, but the details of the six are not announced at this moment. Of but slightly less importance is the announcement of the new four-cylinder model for 1913 described herewith.

The new four-cylinder model is known as the Hudson 37 and while the general arrangement of the chassis is quite similar to that of 1912 the motor is an entirely new design, larger but somewhat simpler in construction than that of this year. Like the present motor, the new engine is a four-cylinder L-type construction and a part of the unit power plant but the bore and stroke of the cylinder larger, the dimensions being 4⅛ by 5¼ instead of 4 by 4½ as in the present model. It is stated that the new motor will develop 37 horsepower on the block at 1500 revolutions per minute. The valves are of nickel steel and are interchangeable. They are 2 inches in diameter, giving 1¾ inches opening. The valves are operated by pushrods that are longer and larger than is usual in this type of engine. The pushrod bearings have been redesigned with the idea of making them easily removable. All of the valve system is enclosed in a dustproof casing, this casing, as last year's, is provided with two plates which are easily removed for inspection.

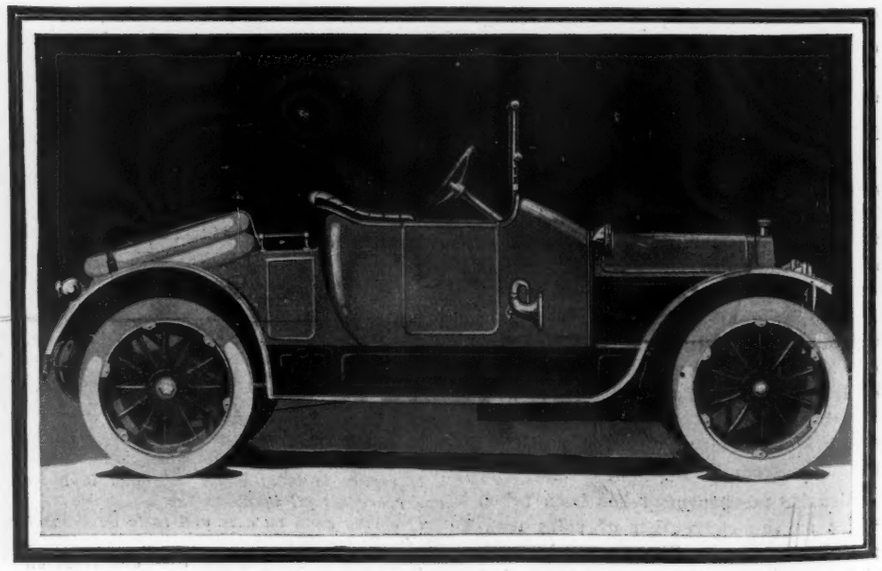
The pistons are longer than obtains in ordinary practice in order to better distribute the side thrusts between cylinders and pistons. The wristpins are pressed into the pistons and secured with nickel-steel studs and cotterpins. The wristpin bearing is of hard phosphor bronze 1 1/16 inch in diameter by 1⅞ inch long and is pressed into the small end of the connecting rod. The connecting rods are deep I-beam section, drop forged and heat treated. The bearing cap is secured to the connecting rod by four nickel-steel bolts and castellated nuts. Thin shims are placed between the cap and connecting rod in order to simplify the taking up of the bearings in case of wear. The crankshaft is of the three-bearing type, the front and middle ones being 2 inches in diameter while the rear bearing is 2¼ inches in diameter by 3 15/16 inches long. The front bearing is 2 7/16 inches long and the middle one 3 inches in length. Connecting rod bearings are 2 inches in diameter by 2⅝ inches in length. The crankcase is an aluminum alloy and carries the three crankshaft bearings bolted to the upper portion of the case so that the lower part can be removed without interfering with the bearing adjustment. Camshaft is made of special steel and the cams are integral with the shaft. This shaft runs on three nickel babbit bearings. The timing gears are helical and are enclosed in a dustproof case in the front of the motor.



FRONT VIEW OF MOTOR

The cooling system is of the same design as employed in the 1912 cars and consists of a centrifugal water pump with a vertical tube radiator secured to the side members of the flange. A reinforcement in front of the radiator gives it the appearance of a cellular construction.

The motor is lubricated by a constant-level splash system with the reservoir beneath the crankcase. A new type of pressure distributer plunger pump oper-



1913 HUDSON MODEL 37 ROADSTER

Details of New Car for 1913 Season

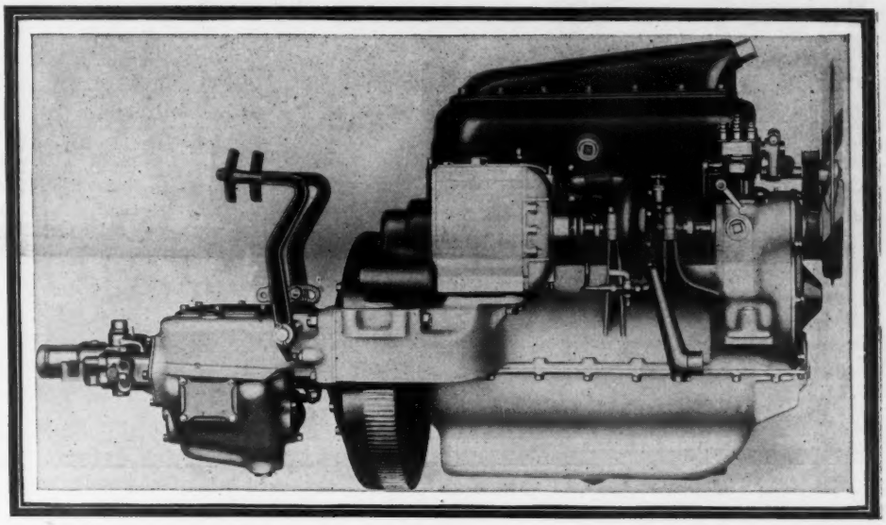
Delco Starting, Lighting and Ignition System and 12-Inch Upholstering

ated by the camshaft furnishes oil to the front and rear bearings. The oil before being fed to the motor goes through a strainer and then to the pump. An oil pressure gauge on the dash indicates the circulation.

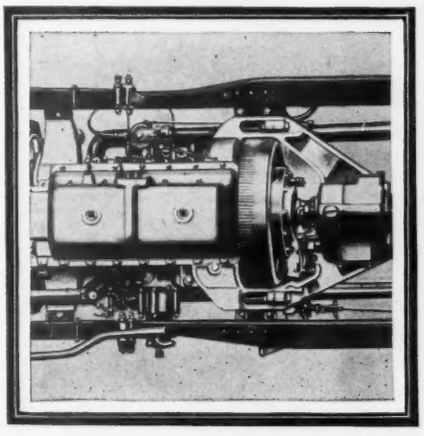
The motor is equipped with a special carbureter which is provided with a dash strangler to facilitate starting in cold weather. The supply of gasoline to the carbureter shows an advance in practice over 1912 construction. This year fuel is supplied by gravity but in the new model gasoline is fed to the carbureter under pressure. The pressure in the tank is regulated automatically by an air pump driven by the motor camshaft and an air gauge on the dashboard indicates the pressure in the tank.

Consideration of the ignition system develops one of the most comprehensive changes in the Hudson 37. Instead of the high-tension magneto and battery employed this year we find that the three functions of ignition, starting and lighting are performed by a single system. This is the Delco electric combined system. So far as the ignition itself is concerned, the Delco system furnishes a dual ignition with a magneto type of spark from the generator for ordinary running and dry battery ignition in case of emergency.

This combination ignition, starting and lighting system has been described in detail in the pages of Motor Age. It is sufficient to say that so far as the starting function is concerned the motor is cranked and started by electricity, the generator momentarily becoming a motor and using current which has been stored up by it in a storage battery. It runs as a motor only long enough to start.



HUDSON POWER PLANT, SHOWING DELCO MOTOR GENERATOR



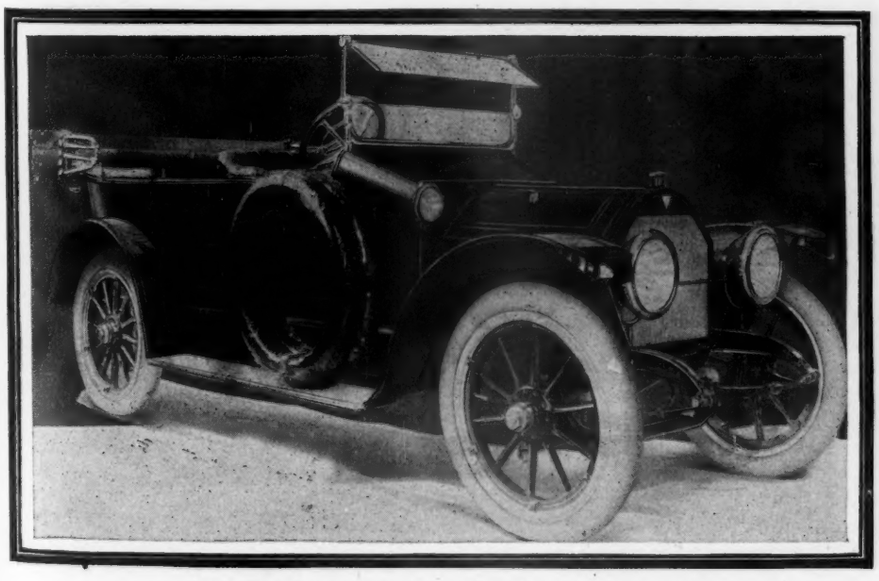
ARMS AROUND CLUTCH TO MOTOR BASE

The clutch is of the same design as is employed at present. This is a multiple disk type, self-contained in an oil-tight case which is a part of the flywheel. All disks are made of steel stampings and are $8\frac{1}{16}$ inches in diameter. The driving disks have cork inserts. The clutch spring is located in a hole bored in the end of the crankshaft and the pressure is transmitted to the clutch drums through a ball-thrust bearing. Small springs are placed between the disks in order to facilitate their separation.

The three-speed selective gearset is bolted to the motor base by means of two arms integral with the gearset housing which pass on either side around the clutch making a unit power plant. This construction assures perfect alignment between the crankshaft, clutch and transmission shaft. Large-size roller bearings are used throughout the gearset. These are mounted in malleable iron cages to prevent them from working loose.

From the gearset, power is transmitted though a propeller shaft and two universal joints to the rear axle. The shaft is of heat-treated nickel steel. The forward end slides in the transmission universal joint, the sliding square of which is rather larger than usual.

The rear axle is of pressed steel and is of floating type. Driving gears and differential are mounted as a unit which is bolted to the axle and is easily removed without taking down the whole axle. The construction of this unit is such as to allow the adjustment of pinion and driving gear without interfering with other parts. Pinion and differential case is mounted on large roller and thrust bearings and the whole runs continuously



THREE-QUARTER VIEW OF HUDSON TOURING CAR

SIDE VIEW OF CHASSIS OF NEW HUDSON MODEL 37, SHOWING TORSION BAR

in a bath of oil. The driving shafts are made of nickel steel, oil-treated, and can be removed without disturbing any other parts of the axle. They drive the wheels through a flange bolted to the latter.

Driving pinions are made of nickel steel and hardened. A large removable plate is provided on the back of the axle for inspection, cleaning and removal. Each end of the axle carried two roller bearings on which the wheels are mounted. Strains from the end of the transmission shaft and universal joint are taken up by a torsion arm, one end of which is mounted on the axle and the other held by a double spring buffer.

Double brakes are placed on the rear wheels. There are 14 inches in diameter and 2 inch face, an increase of 2 inches in diameter over the brakes employed at present. The foot brake is external contracting and the emergency brake is external expanding. Both are lined with a special non-burnable lining.

The front axle is an I-beam drop forging which measures 2⅜ inches by 1½ inches at its smallest point. The wheel spindles are of special steel and carry large-size roller bearings on which the wheels are mounted. Two phosphor-bronze bushings are pressed in each of the spindles and reamed in place to have a bearing fit on the king bolt. The latter is $\frac{13}{16}$ inch in diameter of hardened nickel steel. The bearings are lubricated through a hole drilled through the top of the king bolt and corresponding to two grooves cut on its side. A grease cup is screwed on top of the bolt. Wear between the wheel spindle and the axle yoke is prevented by means of a hardened steel washer placed between them. Also a steel washer carrying felt on the outside is pressed on the wheel spindle in order to prevent the lubricant from working out.

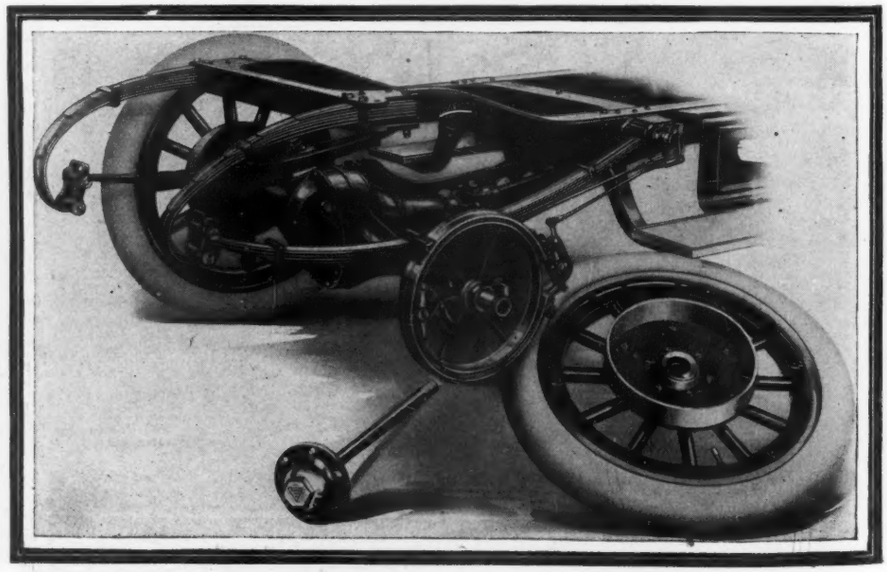
Side members of the frame are pressed channel steel, the section of the channel is 4 inches high, 3¼ inches deep and $\frac{5}{32}$ inch thick. They are narrowed in front in order to permit a greater angularity of the wheels so that the car may be turned in a circle of smaller diameter than is possible with an average car of this wheelbase. A drop of 4½ inches is made on the rear of the frame.

All four springs are made flexible by the use of a large number of thin leaves; these leaves are tongued and grooved to prevent their working sideways over each other and phosphor bronze bushings are provided in the spring eyes to prevent squeaking. The front springs are semi-elliptic, 37 inches long by 2 inches wide and the rear springs are three-quarter elliptic, 50 inches long by 2 inches in width. Steering is taken care of by what is known as a non-reversible type of gear, that is, a worm and gear combination. The worm gear, which is integral with the shaft, is a full circle and not a segment. Demountable rims are fitted with 36 by 4-inch tires. The wheelbase is 118 inches.

The gasoline tank is placed on the rear of the frame and is held in place by two leather-lined brackets. A magnetic gasoline gauge is placed on the tank, showing at all times the amount of fuel in it.

The lighting equipment consists of electric headlights, sidelights, tail lamp and dash lamp with an extension light which may be plugged in at various points on the car for night work. All lamps can be lighted directly from the generator or from the storage battery. The dash lamp is in series with the tail lamp and acts as a telltale on the latter.

Bodies supplied on this four-cylinder Hudson chassis include a five-passenger touring car, five-passenger torpedo, two-passenger roadster, a limousine and a coupe. The care that is taken to insure comfort in riding is shown by the fact that 12-inch upholstery is used.



BRAKE AND SUSPENSION FEATURES OF HUDSON

The Motor Car Repair Shop

Tuning Up the Car

Ignition System Inspection

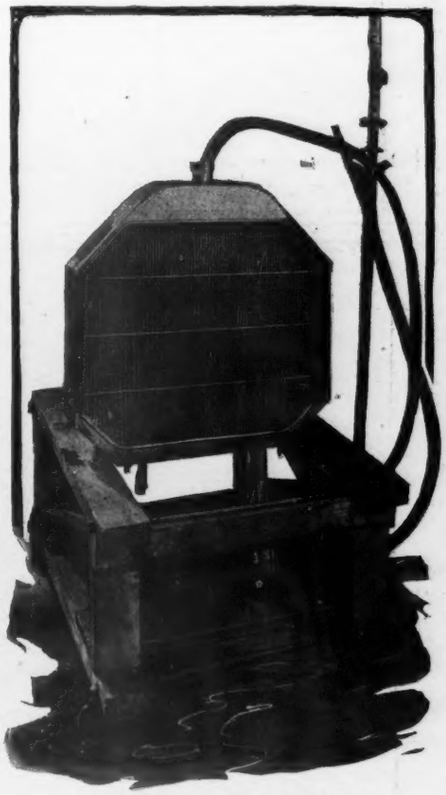
BY tuning up a car is meant the making of such adjustments as are required to put it in good running condition and applying oil to all working mechanisms so that they lustrate, a motorist once brought his car into a repair shop to have it tuned up. There was nothing radically wrong with it except that the motor seemed to have lost power. The car was a new one, having been obtained from the factory a couple of months before and it had been running beautifully up to within the last couple of days. The first thing the repair man did was to test the compression of the motor by cranking it slowly. He pronounced the compression to be only fairly good. The storage battery was then inquired about and the owner told him that it had been run down for several days and was now being recharged, but that the engine had run just as well on the dry cells as on the storage battery. The repair man cautioned the motorist in regard to the folly of allowing his storage battery to become so completely discharged. He further advised that the valves be ground in, that the lubricating oil in the circulating system of the motor be changed and the dry cells replaced with a fresh set. "All that your car needs," he said, "is a little tuning up."

The car was then left with the repair man with instructions to restore to the motor its power. Consequently the valves were ground in, the operation proving a simple one as they had not been neglected to such an extent as to become badly pitted. The lower portion of the engine case next was removed and the black, dirty oil, together with the sediment contained in the case, cleaned out with gasoline; a squirt gun and gasoline being employed to clean out the corners and such parts that could not be reached with a brush. Kerosene was employed in the squirt gun to cleanse the internal working parts in the upper portion of the case; and the bottom section then was replaced and refilled.

A fresh set of dry cells was next put into the car, and all connections securely made and arranged so that there would be no danger of their coming in contact with one another or the sides of the metal battery box. Some old rubber matting that had been lying around the shop was cut so as to form a lining for the box; and as an added precaution, the contact points of the coil were carefully examined, adjusted and cleaned, while the wire connections of the coil also were examined and the loose ones tightened. The spark plugs then were removed and cleaned and the sparking points adjusted where adjustment was required. The high-tension cables from the coils to the plugs were inspected to insure that they were not touching some metal portion of the engine where damage to the installation might occur, and the low-tension wiring was carefully inspected and all connections between the timer, coil and batteries tested and tightened. The timer cover was removed and the internal parts cleaned up and oiled; then the cover was replaced and tape was wrapped around all portions of the wires that were apt to be damaged by contact with the engine.

A general cleaning up of the outside fittings of the motor was the next operation and at the same time as each part was freed from its accumulation of grease, dust or dirt, a watchful eye was kept on the lookout for loose nuts, etc.

The repair man then took up a hand oil can and proceeded to oil all outboard bearings from the motor back to the rear axle. While doing this he carefully inspected all parts, screwed up all grease cups and refilled those that required a fresh supply, tightened up all nuts that were found loose, then returned to the motor and went over it in the same manner. While going over the motor all ignition control mechanisms were carefully inspected, as well as those of the carbureter and its gasoline connections.



FLUSHING OUT RADIATOR

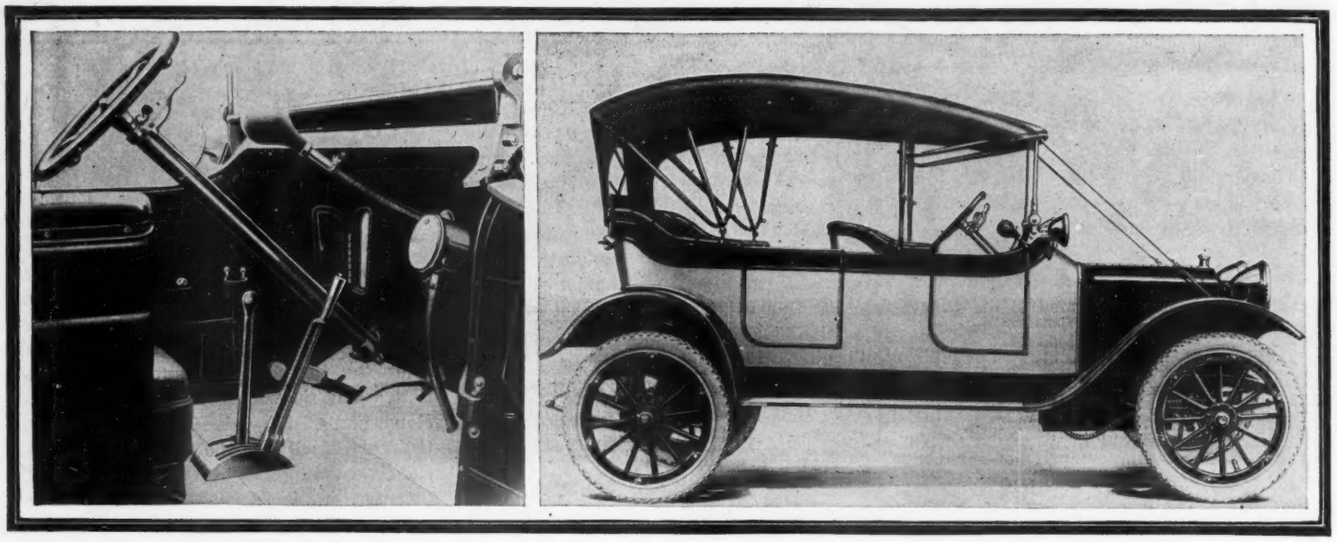
The motor then was started and after letting it run for about 5 minutes, until it became thoroughly warm, and watching its operation during this time for any irregularities or disposition to overheat, the repair man then shut it down and inspected the space between the pushrods and valve stems. This was first done by testing the compression to see if any of the cylinders were particularly weak. It often happens that after a valve has been ground in, the end of its stem is brought into such close contact with the valve tappet or pushrod that when the motor becomes warm and elongation of the valve stems takes place, the valves will not be permitted to seat tightly. Adjustment of the valve tappets therefore is necessary. On old cars where non-adjustable valve tappets are employed it generally is necessary to file or grind off the end of the valve stems, but where adjustments are provided one has but to loosen the lock nut on the valve tappet and adjust the stud so that about 1-32 inch space exists between the tappet and the stem when the motor is cold.

Flush Out the Radiator

In the Locomobile repair shop, Chicago, it is customary to flush out the radiators of all cars which come into the shop for an overhauling. This is done, not because the radiator may be in need of this flushing out, but on general principles. It is a well-known fact that the operators of motor cars are not always as careful as they should be in replenishing the water supply of the radiator, consequently accumulations of dirt and sediment therein often occur which give rise to overheating and other troubles, due thereto. It is well therefore, for all repair shops to provide means of flushing out all radiators taken from motor cars that are disassembled for an overhauling.

The equipment required consists simply in a rack of some sort on which to support a radiator over the washrack in its upright or an upsidedown position. It is advisable to start flushing a radiator while inverted; that is, with the radiator turned upsidedown, and the water from the hose entering in the opposite direction from which it usually enters when the radiator occupies its usual place on the car. The object of this is to loosen up particles of dirt and scale that may be jammed in between the tubes or cells in such a way that only a reversed flow of water through the radiator will loosen them. After the water has flowed through the radiator for 15 or 20 minutes in the reversed direction it may be placed upright on its stand, the water hose applied as shown in the illustration and a stream of water allowed to flow through it in the regular way for an hour or two.

1913 R. C. H. Features Equipment



CENTER CONTROL OF R. C. H.

NEW R. C. H. FIVE-PASSENGER TOURING CAR

COMPLETE equipment seems to be the keynote of the R. C. H. for 1913. With the exception of a fuller line of accessories the only change in the offering for the new season is the discontinuation of a self-starter as stock equipment. Inasmuch as the equipment is a feature for next year it will be mentioned first. R. C. H. cars are sold with the following accessories: Electric lights with 100-ampere-hour battery, Jiffy curtains, Bosch magneto, demountable rims, extra rim and holder, rear-view mirror, top and cover, windshield and the ordinary standard touring equipment.

The only mechanical changes which the new car shows are the placing of a hand-throttle lever and spark lever on the steering column just below the wheel and the addition of a hand-lever emergency brake in place of the former foot emergency brake. In the previous cars, two foot brake pedals were used, one being the clutch and service brake combined, while the other operated the rear brake drums. The service brake operates on the transmission as in the earlier model, but it is now a seperate pedal, while the lever replaces the other pedal to bring the emergency hub brakes into play when needed for an unusually quick stop.

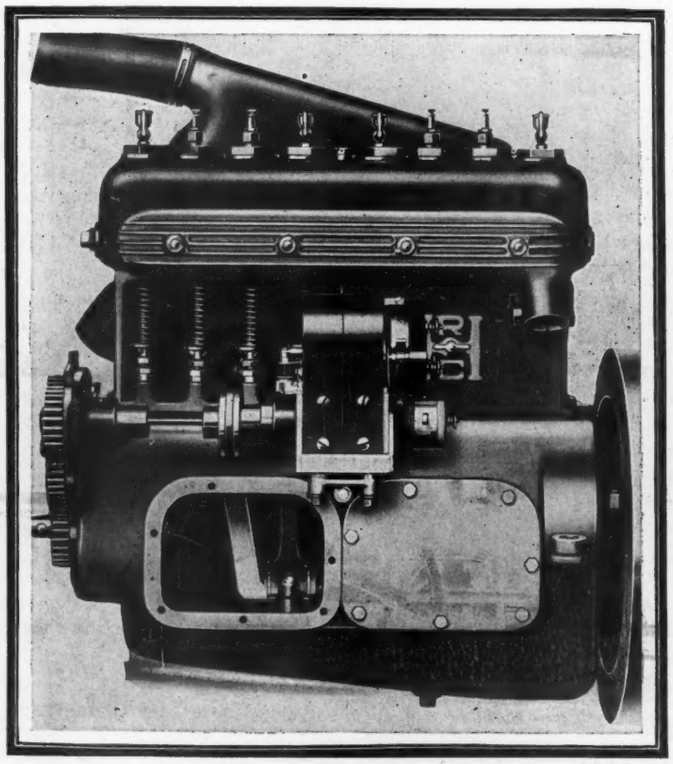
Long-Stroke Motor

Mechanically, the car is the same in respects as this year's product. No change whatever has been made in the four-cylinder, monobloc motor. The motor is of the long-stroke design, its bore being 3¼ inches and stroke 5 inches giving it a stroke bore ratio greater than 1.5 to 1. The cylinders are cast en bloc and timing gears and valves are all inclosed, making them neat, clean and quiet.

The crankshaft is mounted on two bearings—one at either end, which is in keeping with the general compact construction of the power plant. The motor is mounted in the frame of the car on the three-point suspension principle, there being a support at either side of the crankcase in front and one in the center in the rear. The valve rods and springs are all inclosed by an easily-removable coverplate, while the timing gears are housed by plates fastened with cap screws.

Inclosed Valves

Valves are all on one side so that there is smaller combustion space and less loss of heat to water jacket. Valve seats are nickel steel and stems of carbon steel. Intake and outlet pipes are especially large. Dynamometer tests have been made, it is claimed, with exhaust manifold, pipe and muffler in place, and also with them removed and no difference in horsepower was found, showing the exhaust passage free from back pressure. The exhaust pipe is cast separately, making it independent of cooling system. Cast integral with cylinders would mean water cooling on one side at least, making water absorb extra heat and tending to over-heat. The crankshaft is 1⅞-inch diameter on the main and connecting rod bearings. Bearings are unusually large for motor of this size.



R. C. H. MOTOR SHOWING VALVE HOUSING AND AMPLE CRANKCASE ACCESS

Barrel-Type Crankcase

The crankcase is of the barrel type, and is oil-tight. There are no bolts to loosen and bearings cannot get out of line. Removable plates make inspection and connecting rod-adjustment easy.

There are no batteries or coils in the R. C. H. ignition system. The Bosch magneto carried at left side of motor and driven from magneto gear in forward

No Mechanical Changes for Next Season

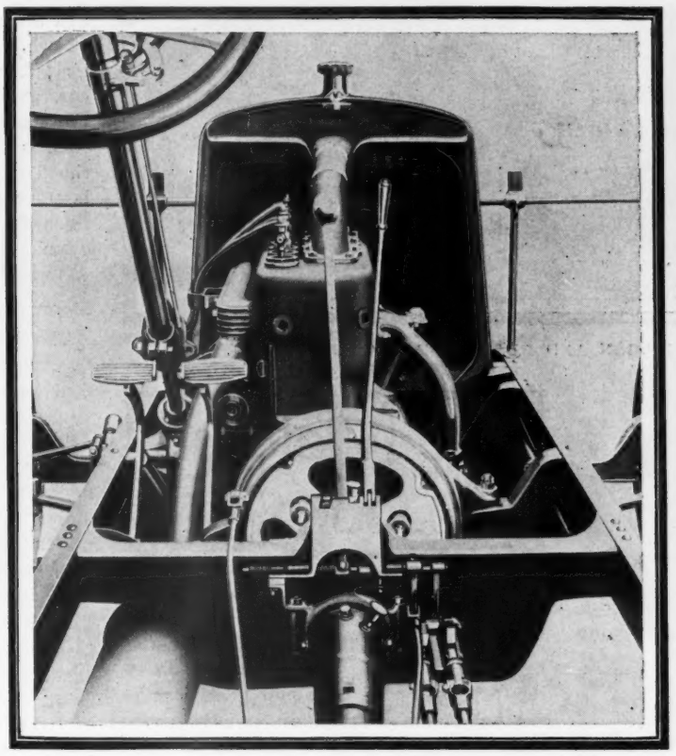
housing forms the single source of ignition current.

Cooling is by the thermo-syphon system, an extra large radiator with supplementary tank giving water capacity of 3½ gallons. This does away with fan and pump.

Lubrication Features

Lubrication is a constant level splash system, the same oil up or down hill. The under sections of connecting rods are fitted with scoops which dip into the metal troughs which regulate height of the oil. The amount of oil is regulated by upper and lower level pet cocks and crank case. A splash wheel into reservoir, is the only working part.

The carbureter employed is the B-D standard. It has only two adjustments. It is placed on the opposite side of the motor from the magneto, reducing chance of firing the gasoline and allowing gas to heat while between the cylinders. Hot air is supplied from between cylinders.



MOUNTING OF R. C. H. GEARSET CONTROL

The cone clutch is leather faced, engaging in the flywheel which is fan-spoked. The clutch is 1¾ inches wide, 11½ inches in diameter.

Final drive from clutch to gearset is through two grease-tight universal joints and a propellershaft 1⅛ inches in diameter. The clutch joint is adjustable for wear, The propellershaft housing serves as a torque tube and is braced by steel rods reaching to the rear axles. All driving strains are taken through this tube, the ball joints permit of free and smooth action.

The R. C. H. transmission gearset is of the sliding gear selective type, and has three speeds. It is located on the rear axle. This position reduces the angle of shaft from clutch to rear axle. The differential is of the bevel gear type with four bevel pinions. The spider is forged solid, ground on the bearing surfaces and is formed of chrome-nickel steel. The bevel pinion is solid with shaft and the meshing with the bevel gear is adjustable. The pinion has twelve teeth, bevel fifty-one teeth, affording 4.25 reduction. The rear axle is of the semi-floating type. Full adjustment of both bevels can be made by removing the plates on rear axle and gearset housings.

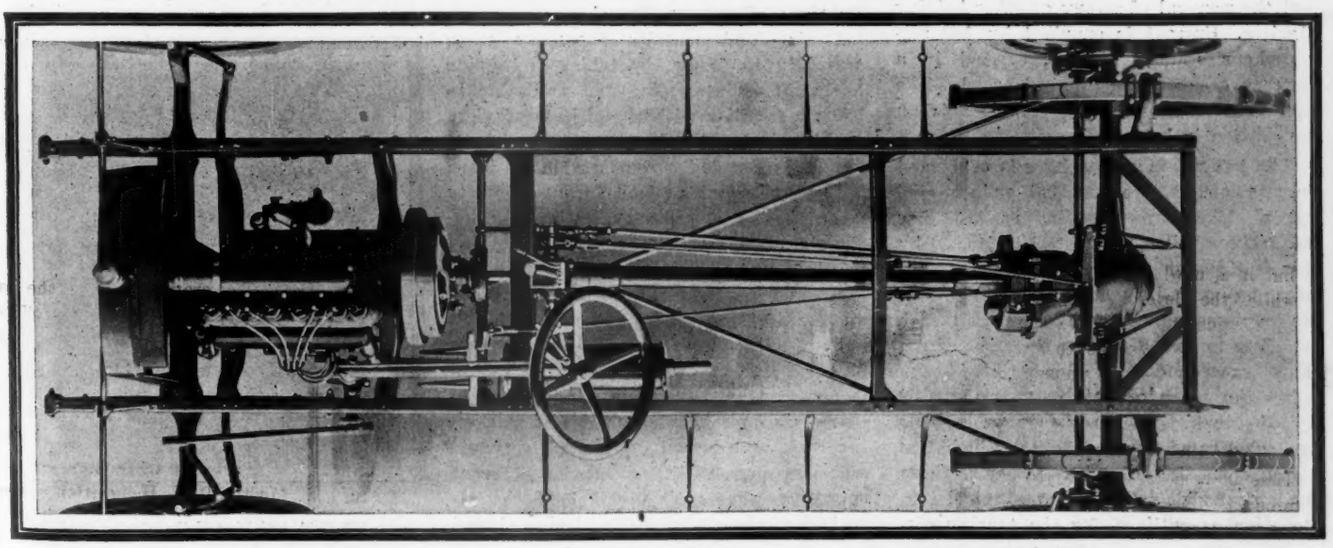
Left-Hand Drive

R. C. H. cars are driven from the left side, and gears are shifted by a center lever operated through an H-plate convenient to the driver's right hand. The steering gear is of the irreversible worm type, unaffected by irregularities of road. The gear is easily removable for adjustment, a feature that saves much money at the repair shop. The 16-inch steering wheel is one piece, with no cracks to open and become unsightly. Spark and throttle control are on the steering column and in addition there is a foot-operated accelerator.

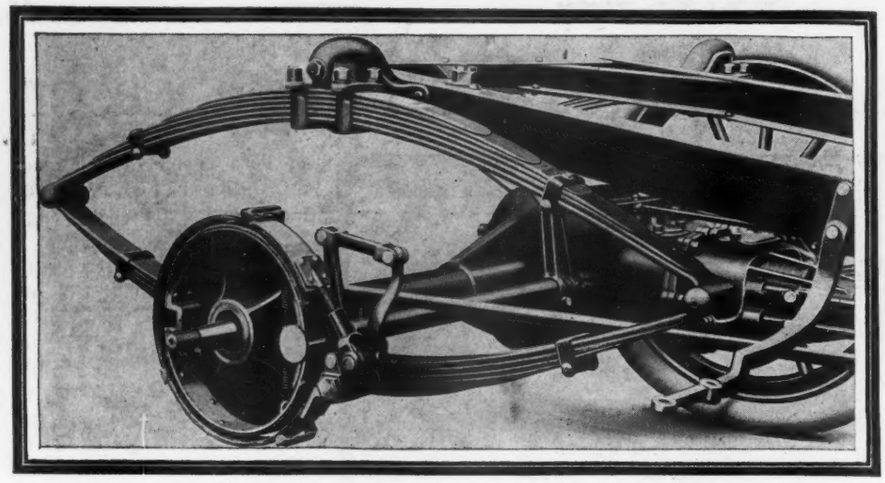
Brakes include a hand-lever emergency brake at driver's right operating at the right of H-plate. The service brake is operated by right foot. This gives two complete sets of brakes on the car. Brake equalizers cut down liability of skidding and give equal wear on tires.

The front axle is one-piece I-beam, drop forged. The front springs are semi-elliptic; rear springs are elliptic and are mounted on swivel seats and slightly uptilted. The swivelled springs do away with strains on the frame and the tilt means that in hitting a bump the shock is taken at right angles, giving an easier riding car. The frame of pressed steel with five cross members hot riveted in place.

Tires are 32x3½ inches in size and the wheelbase is 110 inches and the road clear-



PLAN VIEW OF CHASSIS SHOWING REAR AXLE, GEARSET AND BRAKE EQUALIZERS



REAR SUSPENSION AND BRAKES OF R. C. H.

ance is 10½ inches. The weight of the touring car is 2,000 pounds and of the roadster 1,800 pounds.

As to body design, this $900 touring car presents a decidedly foreign light-car and sweeping lines. The cowl has a low slope which is set off by the same windshield as when the car made its debut. The door handles are all inclosed, while, except for the battery box, the running boards are clear. The interior of the car has been designed to give the maximum of leg room consistent with the wheelbase of 110 inches. Seats are set at a comfortable angle, which the designers have deemed most restful for all occasions on the road.

The lamps used on the 1913 R. C. H. are all of the bullet type. The headlights are 12 inches in diameter, fitted with 16 candle-power bulbs and double parabolic lens; side lamps 6 inches in diameter with 4 candle-power bulb and parabolic lens, and the tail lamp 4 inches in diameter with 2 candle-power bulb. Ediswan sockets are used throughout. On the headlights the parabola is set into the body of the lamp, allowing easy access to bulbs and focusing device, and permitting of the cleaning of parabola or glass in the door without the removal of screws or other holding devices. Current is supplied by 100 ampere-hour storage battery, carried in a battery case on the running board. The specification of non-skid tires is also an innovation in low-priced cars.

The two-passenger roadster is continued in two models, the standard and the EE types. The former, selling at $700 has head lamps, oil side and tail lights, 30 by 3-inch tires on clincher rims, gas generator, top and Jiffy curtains and horn as its regular equipment, while the EE model, which is to cost $750, has the same equipment except that a Prest-O-Lite tank takes the place of the generator and 32 by 3½ inch tires on demountable rims are substituted for the 30 by 3-inch tire equipment. In all other respects, these roadster models retain the mechanical construction as outlined for the touring car.

The Motorists' Bookman

The Land of Heart's Desire

"CANADA; The Golden Land," written by Arthur E. Copping and illustrated by Harold Copping, is a simple sketch of the populating of Canada's great northwest, and more or less of an exploitation of the efforts of the Canadian Pacific Railway in this direction. It reads like a story of dreams come true, when from a beginning with nothing a man may in 2 years' time possess 160 acres of finely productive land, with the necessary equipment for its cultivation, a shelter and sustenance, and the third year start a bank account. The writer has pictured the healthful simplicity of this broad, fair country, the content and prosperity of its people, and yet withal, the tale is so extremely simple one feels he has scarcely measured up to his subject. In some of the illustrations, in color, the atmosphere of the country is well conveyed. Published by George H. Doran Co., New York. Price, $1.50.

Details of European Travel

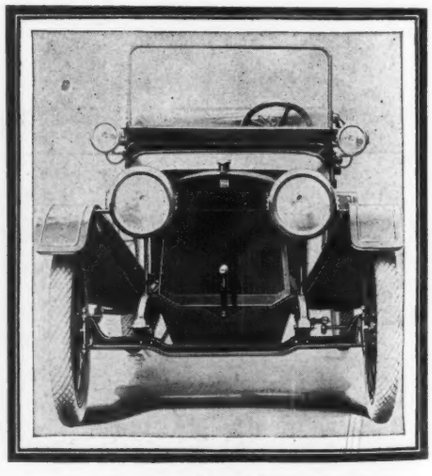
It is fundamentally necessary when traveling to study timetables and guide books; it is interesting and profitable to become familiar with the objects of virtu or historical value in the places visited; but it is decidedly comfortable to learn beforehand what to look for and how to meet the little, ordinary, intimate experiences of daily life amongst a foreign people. Just such information has Blanch McManus given in "An American Woman Abroad." A couple of hours with this book is like an evening's visit with an observant friend whose power of recital is equal to his perception. Conditions to be met in housekeeping, modes of marketing and what may be procured, servants and the cost of living in the different countries—phases that will hold the attention of one contemplating living abroad —are each given a chapter. For the woman traveler who is doing Europe after one fashion or another, the various hostelries are discussed to her profit. The—to many —perplexing subject of tips is advantageously handled, while shopping, the cafes, and the social side are fully presented. All of which is interesting to one traveling by public conveyance or his own motor car, and some suggestions especially for the motorist are introduced. A chapter each is devoted to the admirable work of the Touring Club of France, and French law for foreigners. The book is cleverly illustrated by the author, and wears a charming dress. Published by Dodd, Mead & Co., New York.

Motor Encyclopedia

The latest edition of the "Cyclopedia of Automobile Engineering," appears in four volumes, containing more than 1,600 pages and illustrated with over a 1,000 engravings. It is intended for general reference on the construction, operation, and care of gasoline, electric, and steam motor cars, commercial vehicles, motorcycles, and motor boats, treating extensively of types of motor cars; driving, garages, repairs, and aeronautics.

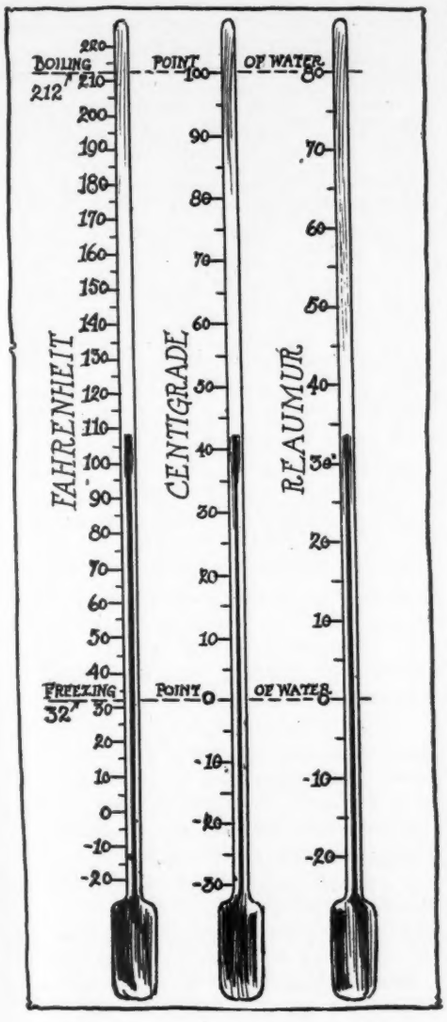
Unlike most encyclopedias, it is absorbingly interesting. Charts and diagrams are made extensive use of, the matter being composed, and explanations being made, with thoroughness, and simplicity. This is largely accounted for by the fact that much of the material in its original form, was prepared for instruction by correspondence. The work is replete with ingenious means of bringing the ideas closer to the readers' understanding, by means of frequent allusions to familiar experiences of everyday life, and by extensive review questions.

The work seems admirably adapted for use as a text, and at the same time is so completely indexed, that it should make a convenient reference work, while the glossary adapted to ready reference constitutes a veritable unabridged of motor terms. Published by American School of Correspondence, Chicago; Price $12.80.



FRONT VIEW OF R. C. H. CAR

The Mathematics of Motoring



COMPARISON OF THE THREE COMMON THERMOMETERS

TWO thermometer scales are in general use in the United States: Fahrenheit and centigrade. In the fahrenheit thermometer the temperature of melting ice is taken at 32 degrees and boiling point of water at 212 degrees; thus there are 180 degrees between the two extremes. In the centigrade thermometer the distance between these two points on the scale is divided into exactly 100 degrees. In order to convert degrees fahrenheit into degrees centigrade: Subtract 32, multiply the remainder by 5, and divide by 9. Thus, convert 59 degrees fahrenheit to degrees centigrade:

$$\text{Then } (59 - 32)\frac{5}{9} = 15^\circ \text{ centigrade.}$$

Or to convert degrees centigrade into degrees fahrenheit: Multiply by 9, divide by 5 and add 32. Thus, convert 40 degrees centigrade into degrees fahrenheit:

Thermometer Scales

$$\text{Then } (40 \times \tfrac{9}{5}) + 32 = 104^\circ \text{ fahrenheit.}$$

Following is a table giving the equivalent degrees of the fahrenheit and centigrade scales, from 1 to 100 centigrade.

The reaumur thermometer is not encountered often in America, but is used to some extent in Europe. In the reaumur scale the fixed points are the same as on the centigrade scale, that is, the freezing point and boiling point of water, but the distance between them is divided into 80 degrees instead of 100. That is to say, 80 degrees reaumur are equal to 100 degrees centigrade, and 1 degree centigrade equals 80/100 or 4/5 of a degree reaumur and 1 degree reaumur equals 5/4 of a degree centigrade. Consequently, to convert any number of degrees reaumur into centigrade degrees, it is merely necessary to multiply them by 5/4. For example, 16 degrees reaumur is

$$\frac{5 \times 16}{4} \text{ or 20 degrees centigrade.}$$

To convert degrees reaumur into degrees fahrenheit, multiply them by 9/4 and add 32. For example, 16 degrees reaumur is

$$\frac{9 \times 16}{4} = 32 \text{ or } 36 + 32 \text{ equals 68 degrees fahrenheit.}$$

Since the distance on the thermometer stem between boiling point and freezing point of water is divided into 180, 100 and 80 equal points respectively on the fahrenheit, centigrade, and reaumur scales, it is clear that 9 degrees fahrenheit, equals 5 degrees centigrade equals 4 degrees reaumur. Hence, since in the two latter scales the graduations begin from the freezing point and on the fahrenheit scale from a point 32 degrees below the freezing point, if F, C and R represent the same temperature on the different scales,

$$\frac{C}{5} = \frac{R}{4} = \frac{F-32}{9}$$

Recapitulating,

To convert degrees, centigrade or reaumur, into degrees fahrenheit:

Let F = No of degrees fahrenheit.
C = No. of degrees centigrade.
R = No. of degrees reaumur.

$$F = \frac{9C}{5} + 32;$$

$$F = \frac{9R}{4} + 32;$$

$$C = \frac{5\,(F-32)}{9}$$

$$R = \frac{4\,(F-32)}{9}$$

Freezing point, or 32° F. = zero in centigrade or reaumur.

Boiling point, or 212° F. = 100° centigrade or 80° reaumur.

EQUIVALENT TEMPERATURES ON CENTRIGRADE AND FAHRENHEIT THERMOMETER SCALES

Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.
0	*32.0	34	93.2	68	154.4
1	33.8	35	95.0	69	156.2
2	35.6	36	96.8	70	158.0
3	37.4	37	98.6	71	159.8
4	39.2	38	100.4	72	161.6
5	41.0	39	102.2	73	163.4
6	42.8	40	104.0	74	165.2
7	44.6	41	105.8	75	167.0
8	46.4	42	107.6	76	168.8
9	48.2	43	109.4	77	170.6
10	50.0	44	111.2	78	172.4
11	51.8	45	113.0	79	174.2
12	53.6	46	114.8	80	176.0
13	55.4	47	116.6	81	177.8
14	57.2	48	118.4	82	179.6
15	59.0	49	120.2	83	181.4
16	60.8	50	122.0	84	183.2
17	62.6	51	123.8	85	185.0
18	64.4	52	125.6	86	186.8
19	66.2	53	127.4	87	188.6
20	68.0	54	129.2	88	190.4
21	69.8	55	131.0	89	192.2
22	71.6	56	132.8	90	194.0
23	73.4	57	134.6	91	195.8
24	75.2	58	136.4	92	197.6
25	77.0	59	138.2	93	199.4
26	78.8	60	140.0	94	201.2
27	80.6	61	141.8	95	203.0
28	82.4	62	143.6	96	204.8
29	84.2	63	145.4	97	206.6
30	86.0	64	147.2	98	208.4
31	87.8	65	149.0	99	210.2
32	89.6	66	150.8	100	†212.0
33	91.4	67	152.6		

*Freezing point. † Boiling point.

Current Motor Car Patents

PATENTS ISSUED JUNE 25, 1912.

1,030,314—Spring Wheel. Alvin R. McEntrie, Folsom, Ga. Filed February 15, 1912. Serial No. 677,681.

1,030,343—Carbureter. Nathaniel C. Stamps, Ocean Park, Cal. Filed February 13, 1911. Serial No. 608,392.

1,030,347—Exhaust Silencer. Zachariah Swearingen, Osceola, Ia. Filed January 27, 1912. Serial No. 673,761.

1,030,348—Protective Covering for Pneumatic Tired Wheels. Lewis J. Tetlow, West Springfield, Mass. Filed July 14, 1911. Serial No. 638,517.

1,030,373—Clutch Mechanism. Frank B. Allen, Salt Lake City, Utah. Filed May 15, 1911. Serial No. 627,354.

1,030,379—Transmission Gearing. Andrew Benson, Chicago, assignor by mesne assignments to Benson Gear Co. Filed September 5, 1911. Serial No. 647,623.

1,030,388—Motive-Fluid Mixer for Internal Combustion Engines. William G. Cross, Seneca Falls, N. Y. Filed October 24, 1908. Serial No. 459,333.

1,030,400—Cage for Roller Bearings. Chester A. Heinzelman, Belleville, Ill. Filed July 25, 1911. Serial No. 640,436.

1,030,401—Roller Bearings. Chester Arthur Heinzelman, Belleville, Ill. Filed November 6, 1911. Serial No. 658,793.

1,030,413—Electric Ignition Device. Joseph J. Lombardi, New York. Filed October 26, 1907. Serial No. 399,262.

1,030,442—Spring-Wheel. John Henry Weldon, Comanche, Okla., assignor of one-half to Charles Sam Wade, Comanche, Okla. Filed June 5, 1911. Serial No. 631,209.

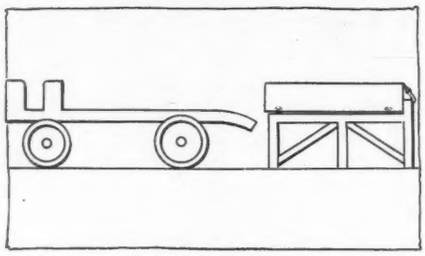


FIG. 2—CRATE FOR LOADING TRUCKS

1,030,463—Fluid Clutch. Guy G. Crane, Rockford, Ill. Filed December 14, 1911. Serial No. 665,635.

1,030,537—Vehicle Tire. Lewis Quintal. Cleveland, O. Filed September 21, 1910. Serial No. 583,063.

1,030,539—Motor Car Stay Strap. George E. Robinson, Medford, Ore. Filed April 27, 1911. Serial No. 623,705.

1,030,583—Self Starter for Motor Cars. Frederick G. S. Hewitt, Detroit, Mich. Filed May 8, 1911. Serial No. 625,699.

1,030,610—Vehicle Wheel. Augustus F. Priest, Chicago. Filed March 17, 1911. Serial No. 615,036.

1,030,686—Gearing for Motor-Driven Plows. Edmond B. Sellard, Mexico, Mo. Filed June 9, 1910. Serial No. 565,925.

1,030,687. Gang and Motor Plow. Edmond B. Sellard, Mexico, Mo. Original application filed June 9, 1910. Serial No. 565,925. Divided and this application filed October 4, 1910. Serial No. 585,181.

1,030,688—Spring Wheel. Herman M. Strawn, Marysville, Cal. Filed May 25, 1911. Serial No. 629,379.

1,030,716—Detachable Wheel Rim. Joe J. Burney, Shreveport, La. Filed December 19, 1911. Serial No. 666,698.

1,030,735—Motor Wagon—Henry M. Kinney, Winona, Minn., assignor to Winona Wagon Co., Winona, Minn. Filed August 12, 1911. Serial No. 643,764.

1,030,793—Steering Gear for Vehicles. Henry Schumacher, Buffalo, N. Y. Filed August 12, 1911. Serial No. 643,699.

1,030,799—Starting Mechanism for Internal Combustion Engines. John L. Barker, Racine, Wis., and Frederic A. Barker, Toledo, O. Filed May 25, 1911. Serial No. 629,462.

1,030,806 — Internal Combustion Engine. Charles Lee Cook, Louisville, Ky. Filed September 17, 1910. Serial No. 582,510.

1,030,809—Resilient Vehicle Tire. Era M. Green, San Diego, Cal. Filed April 17, 1911. Serial No. 621,585.

AUTOMATIC Motor Car Jack—No. 1,030,728. Charles A. Hart, Findlay, O., dated July 25, filed January 18, 1912—The diagram, Fig. 3, shows an automatic jack which comprises two vertical legs, bolted to a frame, having two standards at an angle to one another, and provided with runners pivotally mounted to it, to receive the wheels of the vehicle. In use the wheels are run up the inclined runners until the axle strikes the standards, causing the whole device to rock from its inclined position to a vertical position, the lateral movement causing the wheels to run off the runners at their highest point, the standards holding the axle so that the wheels are free of the floor.

Crate for Loading Motor Trucks—No. 1,030,320. Ralph L. Morgan, Worcester, Mass., dated July 25, filed February 16, 1911—Fig. 2 illustrates a slip, into which a motor truck may be run, consisting of a U-shaped platform, slightly lower than the fixed platform of the truck; and a removable body, mounted on rollers. The body is loaded while on the platform, and is transferred to the truck chassis by backing the latter into the slip, the superior height of the truck platform raising the body clear of the loading platform. It is removed by backing the truck into the slip and fastening the body to the slip, so that the truck's leaving the slip will cause the body to slide off the truck onto the loading platform.

Three-Wheeled Chassis—No. 1,030,357 to William G. Wagenhals, Detroit, Mich., dated July 25, filed May 19, 1911. This patent relates to a motor car chassis comprising a parallel frame, narrowed at the rear to support the axle of a single driving wheel, and provided with supports for an engine sub-frame, and having steering knuckles for the two front wheels, mounted on the extremities of a cross member of the frame, which also carries the front spring seats. A step is attached to the extreme front of the chassis.

Engine-Starter—No. 1,030,430, to Judson O. Roberts, Cripple Creek, Colo, dated July 25, filed September 6, 1910.—The spring-actuated self-starter, illustrated in Fig. 5, consists of a spiral spring, mounted on a starter shaft, connected with the engine shaft; by means of two ratchet wheels, provided respectively with a revolving pawl and a stationary dog, their respective purposes being to wind the spring and to control the transmission of its stored energy to the engine shaft. The starter shaft is reciprocably mounted and equipped with a jaw clutch between the engine shaft and the driving ratchet wheel. In operation, the jaw clutch is engaged by means of a lever located convenient to the driver, which releases the stationary dog, permitting the spring to rotate the engine shaft. When the engine responds, another movement of the operating lever releases the jaw-clutch and engages the stationary dog with the driving ratchet, the rotation of the starter shaft rewinding the spring, until sufficient tension has been imparted to it to draw it away from the revolving pawl.

Wire-Spoked Rims—No. 1,030,428, to John V. Pugh, Allesley, England, dated July 25, filed March 6, 1909—This patent applies to a method of so recessing the metal rims of a wire-spoked wheel as to provide for the angle at which the spoke is to meet the rim, and to indent and puncture said rim accordingly, without substantially reducing the thickness of the metal at the edges of the holes.

New Ignition Coil—No. 1,030,288, to Willard E. Dow, Baintree, Mass, dated July 25, filed September 13, 1907—Fig. 1 represents a coil unit which is the feature of this invention. It provides contacts for

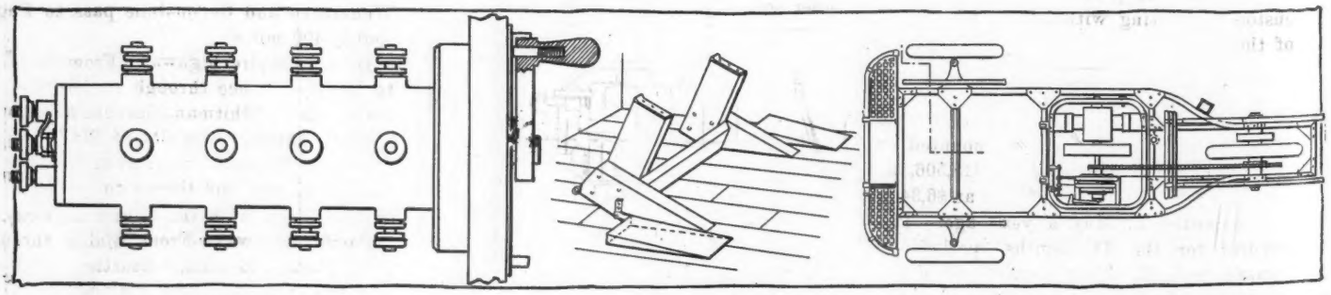


FIG. 1—DOW IGNITION COIL

FIG. 3—AUTOMATIC JACK

FIG. 4—WAGENHALS THREE-WHEEL CHASSIS

a double-circuit magneto, spark plugs, battery and ground, and comprises a switch by which these contacts may be severally made or broken, and having separate contacts for both primary and secondary circuits of the induction coil.

INDIAN RUBBER OUTPUT

Washington, D C., June 29—The rubber output for 1912 in the Madras presidency, India, promises to be a banner year, says the Daily Consular Reports, the custom returns showing that the export business for January alone amounted to $10,216,633 as compared with $7,828,309 for the corresponding time in 1911.

The annual reports of three South Indian concerns—the Travancore, Orkaden River, and Paloor rubber companies, which are all under the same management—show that these interests had the following acreages planted with Para rubber: Travancore, 1,038.78; Orkaden river, 734.3; Paloor, 399. The Travancore Rubber Co., harvested 29,600 pounds of rubber last year; the Orkaden River Co., 4,465 pounds; and the Paloor, nil. The estimates for this year are: Travancore, 67,000 pounds; Orkaden River, 10,000 pounds; Paloor, 6,000 to 7,000 pounds. The Rani Rubber Co. Limited, harvested 193,750 pounds of rubber last year as compared with 41,983 pounds in 1910; the estimate for the current year is 325,000 pounds of rubber; and the total for the first 4 months of this year is 25,110 pounds in contrast to 4,629 pounds in the same period in 1911. This organization has 3,054 acres planted with Para rubber.

HOLDS GARAGEMEN LIABLE

Trenton, N. J., June 29.—The supreme court recently handed down a decision definitely fixing the liability of garages for damage ensuing from accidents during unauthorized trial runs by repairmen. The decision was in favor of Albert G. Brooker, plaintiff, against the F. L. C. Martin Automobile Co., of Plainfield, N. J., defendant. The car had been left at the garage of the defendant for a complete overhauling, and upon partial completion of the job, it was taken out by a shop mechanic for a test. The steering gear failed and the car collided with a tree. The court ruled that in taking out the car without authority, the defendants were liable for any damage sustained by the car in consequence, regardless of the custom of testing without the permission of the owner.

MAY TIRE BUSINESS

Washington, D. C., July 1—The imports of india rubber in May last amounted to 9,802,830 pounds, valued at $8,918,506, as against 6,399,946 pounds, valued at $6,340,948, imported in May a year ago. The imports for the 11 months' period increased from 65,723,492 pounds, valued at $70,736,522, in 1911, to 103,395,020 pounds, valued at $87,570,396, in 1912.

May Imports and Exports

WASHINGTON, D. C., June 29—The latest returns of the federal bureau of statistics show that in May last 3,009 motor cars, valued at $2,963,818, together with parts, except tires, valued at $448,972, were exported, as against 1,466 cars, valued at $1,513,547, and parts valued at $343,879, shipped abroad during the corresponding month of last year. During the 11 months ended May the exports of cars increased from 10,249, valued at $11,262,177, in 1911, to 19,816, valued at $19,433,965, in 1912. The exports of parts, except parts, likewise rose in value from $2,219,294 to $3,745,320 during the periods under consideration.

The detailed shipments of cars for May and the 11 months ended May were as follows:

	—May, 1912—	
	No.	Value.
Exported to—		
United Kingdom	673	465,722
France	63	48,980
Germany	49	36,719
Italy	30	35,605
Other Europe	204	155,125
Canada	1,109	1,352,856
Mexico	8	15,370
West Indies and Bermuda	29	36,237
South America	162	183,292
British Oceania	445	412,565
Asia and other Oceania	152	149,309
Other countries	85	72,038
	—Eleven Months—	
	No.	Value.
Exported to—		
United Kingdom	5,389	4,231,487
France	507	419,816
Germany	261	190,440
Italy	169	157,852
Other Europe	1,062	870,311
Canada	5,533	6,534,088
Mexico	266	410,129
West Indies and Bermuda	299	318,618
South America	1,444	1,736,921
British Oceania	3,479	3,137,612
Asia and other Oceania	1,001	1,038,677
Other countries	406	388,014

One more motor car was imported into this country in May last than in May a year ago, the number in May, 1911, being 75, valued at $158,046, while in May last the number was 76, valued at $165,759. The imports of parts, except tires, declined in value from $47,846 in May, 1911, to $21,493 in May last. During the 11 months' period the imports of cars increased from 771, valued at $1,642,329, in 1911, to $2,033,254 in 1912, while the imports of parts decreased in value from $336,168 to $283,736. Cars were received from the following countries during the two periods.

	——May——			
	—1911.—		—1912—	
	No.	Value.	No.	Value.
Imported from—				
United Kingdom	19	$36,941	11	$28,324
France	26	62,442	41	95,965
Germany	13	26,460	5	10,114
Italy	7	12,799	11	17,424
Other countries	10	19,404	8	13,932

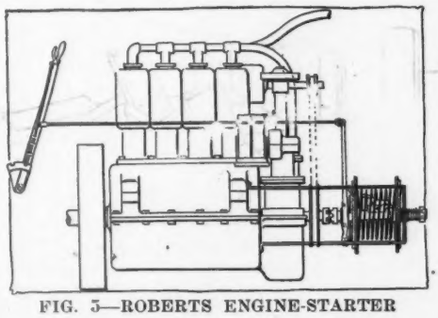


FIG. 5—ROBERTS ENGINE-STARTER

	——Eleven Months——			
	—1911—		—1912—	
	No.	Value.	No.	Value.
Imported from—				
United Kingdom	116	$265,562	181	$417,506
France	348	728,507	330	914,529
Germany	96	215,640	113	250,507
Italy	116	217,694	126	189,130
Other countries	95	214,926	121	261,582

The exports of motor car tires in May last were valued at $272,346, as against a value of $310,346 in June a year ago. However, during the 11 months' period ended May the exports increased in value from $1,838,482, in 1911, to $2,335,920 in 1912.

RATES MAKERS PAY FOR WOOD

Lansing, Mich., June 29—Of all the wood-using industries of Michigan, the makers of motor cars pay the highest price for what they use, according to a report of the wood-using industries of Michigan by H. Maxwell, expert for the public domain commission. The report says:

"They demand no wood that is not demanded by other manufacturers, but they must have the best, and high cost is the result. Twenty-six species of wood are listed, the three most largely used being white ash, hickory and yellow poplar. The cheapest of the twenty-six species costs more than $20 a thousand, while three of them cost more than $100 a thousand; these being black walnut, mahogany and Circassian walnut, the latter being $345 a thousand. The strong, stiff woods are made into frames; hickory goes principally into wheels; much of the interior of the bodies is of elm, while the fine, handsome woods are used for finish for tops and bodies. A fine motor car requires a rather large amount of expensive wood for finish in the windshield frame, the panels of the body, the steering wheel and other parts and trimmings. The wood finisher does his best work on this class of output. More than two-thirds of the motor car wood is not grown in the state, and the home product is cheaper. Its average cost is $52.81, while that brought from elsewhere is $59.56."

MILLIONS FOR TRUNK LINES

Tacoma, Wash., June 29—Ten million dollars will be spent in the state of Washington completing three trunk lines of a total length of 1,000 miles, under the direction of the Washington Good Roads Association, as follows:

Sunset highway—From the Idaho state line at the eastern terminus of the Apple way, through Spokane, Davenport, Wilbur, Wenatchee and Snoqualmie pass to Puget sound, 400 miles.

Inland Empire highway—From Spokane to Rosalia, thence through the most feasible routes to Whitman, Garfield and Walla Walla counties to the city of Walla Walla, across the Columbia river at or near Pasco, North Yakima, and thence to the junction at Ellensburg with the Sunset highway.

Pacific highway—From Blaine through Bellingham, Everitt, Seattle, Tacoma, Olympia, Chehalis and Kalama to Vancouver, 350 miles.

From the

LOWELL Traffic Regulations—Street traffic rules have been adopted by the Lowell, Mass., city officials similar to the regulations in use in Boston and other cities designed to improve conditions.

Iowa Road Decision—County motor vehicle funds may be used for the dragging of roads with drags, according to a decision of the Iowa department of justice last week. The question was raised as to whether the county motor vehicle fund can be used for temporary roads or whether the law contemplates that it shall be used for permanent road improvements after surveys have been made.

Atlanta Meet Idea Abandoned—The Atlanta Automobile and Accessory Association has about decided to give up its attempt to hold a meeting this summer on the Atlanta speedway. A canvass of the situation demonstrated that a good entry list could be secured, but the scheme went on the rocks when the enormous cost of putting the track surface in condition was learned.

Panama Adopts Traffic Laws—Laws governing motor traffic have just been enacted in Panama City. Within the city the speed limit is fixed at 15 miles per hour, but cars must be under instant control at the intersection of all streets. A license charge also has been arranged. Pleasure cars are required to pay $4 per year, while commercial vehicles are assessed $7.50 per year. There are sixty-three motor-driven vehicles in Panama City.

Milwaukee Fixing Streets—After 5 years of practically absolute neglect of asphalt pavements, of which Milwaukee has more than 100 miles, it has been found that the portable repair plant, while highly efficient and economical, could hardly accomplish half the work necessary, and therefore another will be added. The principal streets are now being repaired rapidly and by the middle of August it is expected that every mile of asphalt pavement in Milwaukee will have been placed in as good as new condition.

Fights for Universal Lights—The universal light ordinance proposed for the city of Milwaukee by the Milwaukee Automobile Club, and recommended for adoption by the committee on judiciary, has been amended to apply only to moving vehicles, as there is at present an ordinance in Milwaukee which provides that any vehicle left standing on a street or in an alley must be marked by at least one light visible in both directions. The club endeavored to have its ordinance passed, and the old ordinance abolished, to avoid superfluity and make the ordinances relating to the subject more compact. However, there was danger of losing both ordinances, so the club decided to let well enough alone and have two ordinances to cover the ground which one good statute would cover. The M. A. C., acting with the Wisconsin State A. A., will endeavor to push a universal light law through the next session of the Wisconsin legislature, convening in January, 1913.

This Is a Practical Club—Every motor car owner in Polk county, Iowa, is to be enrolled as a member of the Polk County Good Roads Club which was formed last week. Membership costs $2, all of which goes to the purchase of gravel for the roads of the county. Already plans have been made for the graveling of two mains roads of the county.

Ohio Will Use Convicts—After considerable controversy and searching for the statutes of the state, the Ohio board of administration has arranged for the use of convicts upon two road improvements in Carroll county, Ohio. The state is donating the labor of the convicts and the counties have to house and subsist them. The action of the state board will work a saving of from 15 to 20 per cent in the cost of road building.

Swiss More Lenient—The authorities of the Swiss canton of Valais now permit motor cars to cross the Alpine road over the Simplon pass by daylight, night crossing being strictly forbidden. This will be welcome news to the foreign tourists. The road leads from Brigue in the Rhone valley to Domo d'Ossola in Italy. The trip can now be made in 2½ hours instead of half a day as formerly, says Consul F. B. Keene, of Geneva, but a special permit must first be secured from the Brigue police.

Trying Tannic Acid on Roads—It is announced that experiments in treating Canadian roads with a solution of tannic acid will be conducted by W. A. McLean, provincial engineer of highways, during the coming spring and summer. It has been recommended to the provincial roads department that this treatment will give a wonderfully hardened surface of clay, rendering it tough and rubbery, and surface that will last well, and not be readily softened by even persistent rainfalls. It will also keep down dust.

Building King's Highway—Although progress on the construction of King Edward highway from Montreal to Rouse's Point, N. Y., has been retarded through scarcity of labor, quite a lot of preliminary work has already been accomplished. The route, which will shorten the distance from Longueuil to the state of New York by 12 miles, has been traced and stone-crushing machinery set up at intervals with plenty of stone ready to hand. Equipment in operation or nearly so consists of forty stone wagons, eleven stone crushers, seven engines, thirteen graders and seven watering carts. Six thousand dollars per mile is the estimate for construction so that the total cost of the 40 miles of road should not exceed $250,000. It will be macadam throughout its entire length, a waterproof coating of tar and sand at certain points.

Vancouver an Applicant—The Vancouver Automobile Club of Vancouver, B. C., has formally asked the Pacific Highway Association to hold its fourth annual convention for 1913 in the metropolis of western Canada.

Dawson on Vaudeville Stage—Joe Dawson, winner of the 500-mile race at the Indianapolis motor speedway Memorial Day, is to be starred on a vaudeville circuit as "The Man in the Car," and a part of his turn will be an exhibition of the National No. 8 in which he won the race. C. E. Shuart, publicity manager of the Indianapolis motor speedway, will accompany Dawson on the trip, which will extend through several months.

Planning a Lake Shore Drive—Unless unforeseen circumstances prevent it, a permanent paved roadway will in the near future be constructed along the lake shore between Toronto and Hamilton, Ont., as a result of the agitation which came to a head when a conference of the good roads association, representatives of the councils of the two cities, the wardens of the counties affected, and others, passed a resolution endorsing the scheme enthusiastically.

Tour Helps American Cars—The tour around Sicily last May, in which three American cars, the Ford, Overland and Metz, participated, brought out particularly well the stanchness and durability of the American-made cars, according to the consular trade reports. The little 20-horsepower Ford came in sixth, and the Overland, though delayed through frequent changing of tires, went over the bad roads without loosening a screw or breaking a spring. The durability of the American cars attracted much attention and Consul Hernado de Soto, Palmero, claims it will increase the sale of American cars in the island.

Milliners Blame Motor Car—The modern motor car, with its attendant veil, donned by women motorists, because of damage the wind does to hats, is responsible for the falling off of trade in the millinery line, according to A. O. Niedlander, of Indianapolis, president of the Millinery Traveling Men's Association. The statement was incorporated in the annual report of the president of the association, which was read at the opening session of the convention in Louisville last week. Women who ride in cars are prone to wear hats and affect veils, explained Mr. Niedlander, thereby curtailing the demand for feminine headgear. He also declared that there is less

Four Winds

demand for wearing apparel of all kinds pertaining to home life. All this was laid to the door of the motor car and extravagance.

To Be Done By October—The provincial government expects that the King Edward highway, or the reconstructed road from Longueuil, Canada, to the intercolonial boundary at Rouses' Point, will be completed before October.

Synan on Highway Commission—Governor Foss has at last filled the position on the Massachusetts highway commission made vacant last October when Chairman Harold Parker resigned by appointing James W. Synan, of Pittsfield to the place.

Many Help Build Roads—In 24 hours 24 miles of the Meridian road were completed by citizens through the Codington county, S. D., section. One thousand men were formed into twenty-four committees, each purchasing a shovel to supplant the work of teams and tractors and twelve drags.

Philadelphia to Buy Cars—Out of the present municipal loan of $4,225,000 being floated by the city of Philadelphia $35,000 will be available for the purchase of motor-driven fire apparatus. Bids will be opened on July 8 for seven cars to be furnished the chief engineer, assistant chief and five district engineers; six runabouts for district engineers; a tractor for a water tower and an aerial hook and ladder truck.

Stirring Up Kentucky—The Southeastern Kentucky Good Roads Association, which met in Barbourville last week, will continue a vigorous campaign toward stirring up the sentiment for improved highways in the mountain section of the Bluegrass state. An election has been called for Bell county, where a $400,000 issue will be voted upon this fall. The fiscal court of Whitley county has taken steps toward calling an election to determine the sentiment of the people for bettering the roads through a bond issue.

Rambler Makers Contribute — The Thomas B. Jeffery Co. of Kenosha, Wis., manufacturing the Rambler car, has donoted $1,000 to the fund of $6,000 now being raised by the Kenosha Automobile Club for the improvement of the Lake Shore road within Kenosha county. The club is working under a provision of the new highway law of Wisconsin which makes it compulsory for townships, the smallest unit of government, to raise a sum equal to that provided by any individual or individuals, for the improvement of any stated portion of any highway. The club has selected the Lake Shore road for improvement and intends to force the expenditure of $18,000 on the highway by providing $6,000, obliging the township to provide $6,000, the $6,000 to be duplicated by county and state aid.

Redwood Club Will Have Tour—Dr. E. A. Lyman, secretary of the Automobile Club of Redwood Falls, Minn., has completed the itinerary for the second annual sociability and reliability run of the club, July 12-15. The trip will be about 400 miles. Twenty-five cars and 100 individuals will take part.

Illinois Bankers Demand Roads—Illinois bankers attending the annual convention of group 1, Illinois State Bankers' convention, in Moline last week went squarely on record in favor of systematic road improvement, to be brought about by cooperation between inhabitants of the agricultural and commercial sections.

Denver Does More Sign Posting—Supplementing the posting of many roads out of Denver accomplished last year, the Denver Motor Club has just completed the posting of the Denver to Limon and the Denver to Julesburg roads in Eastern Colorado. The task of marking the Denver to Laramie and Denver to Cheyenne, Wyo., roads will be undertaken at once.

Marking Waubonsie Trail—The route of the Waubonsie trail through central Illinois is partially marked. A painter has been engaged during the past 2 weeks in painting the poles through Macon county, showing the designating marks of the trail association. The trail is now completely marked from Denver, Col., as far east as Monticello, Ill., and will be pushed east to Danville and Indianapolis as soon as possible.

Minnesota Trying Concrete—Concrete as road building material has come to the fore in Minnesota in the last week. Beside the action of Winona county in throwing out macadam bids and re-advertising for concrete the state highway commission has become impressed with the value of the material. It is to be tested out in Steele county and in Hennepin county, also on one of the Minneapolis streets.

Push Spokane Glacier Road—The Spokane-Glacier park division of the Park-to-Park road to be completed October 1, according to plans formed at a meeting at Libby, Mont., with delegates from all points and commissioners from Bonner, Flathead and Lincoln counties. The tentative route is through Spokane, Newport, Priest River, Laclede, Sandpoint, Maravia, Bonners Ferry, Leonia, Troy and Libby. From Libby to Kalispell, meeting there the completed route to Belton, are three routes possible. Bonner, Lincoln and Flathead counties agreed to have their sections ready October 1. Lincoln county's agreement depends on the issue of road bonds held up by temporary injunction.

Costa Rica Taxes Trucks—Motor trucks will be assessed duty at the rate of 1.87 cents on entering this republic, according to a ruling from the treasury department at San Jose de Costa Rica.

Taxed on Capacity—Taxes are being collected by the city of Shreveport, La., on approximately $1,000,000 worth of motor cars. The taxation, however, is not based on the valuation but is graded as follows: Two-passenger cars, $2; four-passenger cars, $3; five-passenger cars, $4; seven-passenger cars, $5. Trucks pay $1 and public transfer wagon $10. The tax is assessed annually.

Controlling Canadian Chauffeurs—An amendment has been passed by the legislature of the provine of Quebec which will give the cities the right to make by-laws controlling chauffeurs as cabmen are now controlled, and to inspect the meters in taxicabs. It will also make possible to establish a fine for passengers in these vehicles who do not pay the regular fare, the standard for which will be set. This has not been possible hitherto.

City to Post Signs—In a message to the select and common councils of Philadelphia Mayor Blankenburg has asked those bodies to make an appropriation of $1,000 for the purpose of placing conspicuously lettered signs for the benefit of motorists throughout the congested sections or such other places as it may be deemed necessary. These sections are to be placarded with signs calling attention to special speed regulations or containing the warnings "Danger," "Run Slow," etc.

Manitowoc Will Help—Five members of the Manitowoc County Automobile Club of Manitowoc, Wis., have donated $1,000 each for the purpose of improving the lake shore road from Manitowoc to Two Rivers, Wis. The sum of $5,000 will be the nucleus of a fund now being raised by the club for rebuilding the present natural dirt road into a fine macadam highway 30 feet wide. The completed lake shore road from Chicago to Sturgeon Bay will provide a drive 235 miles along the west shore of Lake Michigan.

Road Work Tied Up—Kent county, Michigan may be unable to construct the $600,000 worth of new highways which were planned and for which bonds were authorized. This is all due to what is said to be a flaw in the legislative act of 1909. The matter was brought to the attention of county officials when Bolger, Mossen Tillaman, of Chicago, gave notice that their clients would not accept bonds for which they had been given a contract. The bonding firm holds that the state law does not give a county the right to bond for longer than 15 years. The road bonds are for 20 years. It is likely the supreme court will be asked to pass upon the matter.

The Realm of the Commercial Car

THE demands upon the coal dealer by his customers for more prompt and cleaner service are growing more pronounced each day, and while at times the dealer may feel that those requests are a little unreasonable, they seem to be based largely on the spirit of the times for quick action. It is probable that the installation of motor trucks by some dealers in each city has been responsible for the demand for quicker service. The possibilities of this method of transportation have been demonstrated and the high standard of deliveries, judging from a time basis, has come to be regarded as something to be expected generally. For this reason those dealers who have not adopted motor trucks have naturally felt themselves somewhat handicapped. The result has been a universal awakening of interest in the subject of motor truck delivery and any figures on cost and information on availability has been seized upon by dealers who have felt the changed conditions of the last year or so.

The firm of Spaulding & Spaulding, of Buffalo, for some time has felt the need of better equipment, and after making a careful survey of their requirements, concluded that in delivery matters at least an improvement could be made, provided the cost was not prohibitive.

A great many dealers who have seriously considered the installation of a fleet of motor trucks have been bothered by the question of comparative costs of delivery per ton. They have found themselves handicapped in making a comparison by reason of the fact that with the motor truck they have been enabled to keep an accurate record while with their horse delivery system they had no figures on which they could rely. Spaulding & Spaulding, however, some time before they bought their first motor truck, began to keep a careful record of delivery costs and also of complaints on service. They found that the latter were based principally on delays in delivery during the winter months when the streets were in bad condition and in other cases when trips were comparatively long. A matter that entered into their examination of costs was the gradually increasing price of horses, feed and labor.

The use of motor trucks was also looked into, and after thoroughly investigating the field a 5-ton Pierce Arrow worm-driven truck was selected as the firm's initial effort in the new way of delivery. The truck was placed in service the first of September last year, and a man who had been one of the teamsters was selected to drive it. His main recommendation was the care he had always shown with horses. He had little knowledge of truck machinery.

Modern Motor Delivery Service Is Demanded by the Retailers of Coal

The figures compiled by Spaulding & Spaulding between September 1 and June 1 show that the truck actually handled 7,916 tons of all grades of coal at a price of $0.279 per ton, this figure including 6 per cent interest on the investment, general insurance of all necessary kinds, the wages of one driver and helper, tire expense, gasoline, lubricants, repairs and a fair annual allowance for overhauling, as well as an ample margin for depreciation. It was found that in tonnage the truck handled the work of two two-horse teams and one single, and reduced the cost by 20 cents per ton.

Within the same period, 8,093 miles were covered, and one phase of the experience that is of interest is the tire service. It was feared by the owners that this item of expense might be unduly high. Up to date this has been the case although mileage allowed was made in the computation of costs; and the tires on June 1 were estimated as being capable of at least 1,000 miles more.

An important angle was the rapidity of delivery in all kinds of weather, irrespective of the section of the city. Customers were not slow to show their appreciation of the new method, and at no time has it proven to be anything but more efficient and reliable than horses.

Other coal dealers in Buffalo have been watching these experiments with a great deal of interest, with an idea of also adopting motor service, and it is safe to say that because of the success of the Spauldings there will be others doing likewise in the near future, it is believed by Buffalo makers.

MOTOR CHANGES FIRE PLANS

The motor combination chemical and hose wagon is to be converted into a salvage wagon by authorities in Ottawa, Ont. For some time past, Fire Chief Graham has found that a great deal of the loss at fires has been due to water. For instance, in the case of the Powell grocery store on Wellington street, if there had been men who did not have to handle hose, to put up salvage covers right at the outset, about $200 of loss could have been prevented. As a result of a conference it has been decided to make an experiment with the motor combination wagon which is at the central station. At present, in addition to the chemical tank and hose, 1,000 feet of regulation hose is carried. Instead of the 1,000 feet, the amount of hose will be cut to 500 and there will be provision made for carrying a large supply of salvage covers. These will be taken from the other stations.

In the event of a fire there will be from five to seven men on this wagon, which will get there first almost invariably. Two men will go in with chemicals but the others will look after the salvage covers entirely. Then when the other stations

SALESROOM AND SERVICE STATION OF GRAND RAPIDS MOTOR TRUCK CO IN PHILADELPHIA

BOSTON SERVICE STATION OF GRAND RAPIDS MOTOR TRUCK CO.

get to the fire, the men of the chemical tank will devote their attention entirely to the salvage. They will have hammers, nails, etc., so as to be able to nail the covers over shelves in stores, etc. An experiment will be made for a month and if it proves satisfactory it is the intention to ask the board of control for more men and more covers. In other cities the salvage corps plays a most important part in saving fire losses and part of the expense is borne by the insurance companies.

BARBER GASOLINE-ELECTRIC CAR

A new type of gasoline-electric car is being manufactured by the Barber Car Co., York, Pa., which is being installed by many of the steam and electric railroads throughout the country. The car has a number of important advantages over the other type cars now in use. The capital stock of the concern was recently increased from $10,000 to $200,000 to enlarge the plant and carry on the business of the company on a more extensive scale.

The Barber gasoline-electric car is about the same size as an ordinary electric car and accommodates thirty-eight passengers. The car is large and roomy and entrance and exit is made convenient by folding doors on either side in the middle of the car. The 56-horsepower motor and generator used to propel the car are under the body supported on the two trucks. The generator connects with motors on the axles and furnishes the operating power. In winter time the car is heated by air taken from the outside coming through the radiator on the front of the car. The motorman occupies a space on the front part of the car partitioned off from the passengers. Much of the jolting on the electric and steam cars is done away with and riding is made much easier on the new type car. One great advantage of the new car is the absence of overhead wires and also that it is much cheaper to operate than is the trolley car.

About a gallon of gasoline is consumed in operating the car 4 miles. In a recent trip from Sunbury to York over the Pennsylvania railroad by one of the cars, the distance of 82 miles was covered in 2 hours 45 minutes. Twenty-two gallons of gasoline were consumed. The car attains a speed of from 30 to 40 miles an hour on straight stretches of the road and takes the usual grades with ease.

With the increased capital the company is contemplating the erection of a large factory for the manufacture of the car in this city. Plans and specifications are now being prepared for the new building. Work will be started on its erection early this summer. The plant will be one of the largest and most modern in this section of the state. Guy Webster is the president and E. A. Barber superintendent of the company.

COMPLAINS ABOUT MOTOR TRUCKS

A long session of the Montreal board of control was held June 27 when an immense amount of detail work was attended to. Attention was drawn to the increasing use of heavy steam and gasoline motor trucks in the city, by a letter from C. E. Archibald of 871 Dorchester West. Mr. Archibald complained that many of these powerful traction devices had been using Dorchester street, causing so much vibration that he feared not only for the cohesion of his ceilings but for the safety of his house. Some of these trucks, Mr. Archibald stated, weighed 3 tons, and 6 when fully loaded, which he considered must cause a tremendous streets on asphalt pavements. Unless something was done to regulate this traffic, he considered that serious damage would be done to both streets and to residences, not counting annoyance to the general public. He therefore asked if something could not be done to prevent these heavy trucks from operating on residential streets, or at least to lessen the chances for damage to residential property.

COMMERCIAL BREVITIES

The Motor Transportation Co. of Kenosha, Wis., recently incorporated with a capital stock of $25,000, has begun operations and is now furnishing a freight and passenger service from the center of the city to all parts of the south side of the city of Kenosha. A thirty-passenger bus, with a prepayment feature, is the initial equipment. The company is in direct competition with the street railway company but is covering a much larger and more direct territory.

FLEET OF JOHNSON MOTOR VEHICLES USED IN MILWAUKEE POSTAL SERVICE

Among the Makers

DEATH of W. M. Jenkins—Williard M. Jenkins, agent for the Abbott-Detroit and Krit cars in Boston and vicinity, died last week at his home at Exeter, N. H., after a brief illness. Mr. Jenkins was a member of the Boston Automobile Dealers' Association for many years.

Nichols Goes to Detroit—Fred C. Nichols, for the past 2 years connected with the Whitten-Gilmore company in Boston, agent for the Chalmers, has resigned to accept a position as assistant to Percy Owen, sales manager of the Chalmers at the factory in Detroit. R. A. Dobyns has taken Mr. Nichols' place with the Whitten-Gilmore company.

Axle Plant Almost Ready—This new four-story addition to the Timken-Detroit axle plant is rapidly approaching completion. Of steel and brick construction, the new building is 150 feet long and 75 feet wide. Relieving factory congestion, the four floors will increase manufacturing space 15 or 20 per cent. The shipping department will occupy the ground floor. The other three will be devoted to manufacturing purposes.

Receiver Demanded—Suit has been brought in the superior court at Indianapolis by the Indianapolis Light and Heat Co., asking that a receiver be appointed for the Motor Starting Co. The suit was brought on on account of $116 for electric current and it is charged the concern, which has been manufacturing a motor starting device, is insolvent. Lew W. Cooper, formerly president of the board of public safety, is president of the company.

Flint Body Co. Closes Doors—Following an order made in the United States court in Bay City, Mich., the Flint Body Co. closed its doors. Action in the court was taken by creditors of the concern. An inventory will be taken and the future of the company decided. Robert H. Cook, who was vice-president and secretary of the company, has been chosen by the creditors as receiver. The company was incorporated January 1, 1909, and capitalized at $50,000. William E. Stewart, president and treasurer of the company was principal stockholder.

Owner Held Liable—Hereafter, if the proprietor of a garage in Ottawa, Ont., allows a car to be taken from his garage, and the driver of the car commits a breach of the civic motor by-law, the owner of the car will be held responsible, according to a police court decision.

Saxon Company Moves—The Saxon Mfg. Co., one of Toledo's infant manufacturing concerns, maker of lamps, horns and accessories has removed from its original building on South Ontario street to large quarters on Cherry street. The new building has been remodeled, refinished and refurnished.

Walpole Moving to Foxboro—The Walpole Rubber Co., that recently entered the time-making field at its plant at Walpole, Mass., has found the buildings there inadequate to get out as large a supply as the business warranted and so an unused factory at Foxboro, Mass., embracing 3 acres of floor space has just been secured and the work of installing tire machinery will begin at once. The company plans to turn out 1,000 tires a day in this new plant.

Perfex Car Makes Its Debut—"I christen thee Perfex and welcome thee and thy builders into the fold of the many industrial institutions that now grace our fair southland." With these words, H. B. Gurley, assistant secretary of the Los Angeles Chamber of Commerce, broke a bottle of Owens river water over the radiator of the newest motor car to make its advent into southern California. The new car is built in Los Angeles and therefore the welcoming ceremonies. The machine was designed and built by James Fouch in his new plant in Los Angeles. Several wealthy easterners are interested in the Perfex company, among them Paul Brown, a broker and member of the New York stock exchange.

Claims Credit for Wilkinson—Self-starters are not new by any means, according to a statement emanating from the Franklin Automobile Co., Syracuse, N. Y., which says that the first Franklin built by John Wilkinson, the inventor of the Franklin motor, 10 years ago had a compressed air starting device.

Cole Handling Own Product—July 1 the Cole Motor Car Co., of Indianapolis, absorbed the Henderson Motor Sales Co. and will conduct the distribution of its product under the name of the manufacturing company. C. P. Henderson, who has been the active head of the sales company, is retained as general sales manager.

Estep Quits Packard—E. Ralph Estep, advertising manager of the Packard Motor Car Co., has resigned his position and is no longer connected with that company. Mr. Estep has had charge of the Packard advertising, except at two brief intervals, since the early years of the company. Mr. Estep's future plans are not announced. As yet there has been no successor appointed, at the Packard plant. No reason is given for the change.

Krit's New Testing Track—The Krit Motor Co. has introduced a novelty in its test of completed cars, which will appeal with force to other companies in Detroit, which have been troubled by the necessity of testing on city streets. The Krit people have built a private roadway near their plant on the boulevard, and are now doing all their testing there. The track is generally circular and contains one smooth straightaway for the development of speed; a hole of deep sand to test the pulling powers of the cars, and a spot where hard

GROUP PICTURE OF PROMINENT MEN IN THE MOTOR INDUSTRY WHO ATTENDED HOMECOMING

and Dealers

irregularities and bumps develop whatever weaknesses the cars have in structure, material and spring suspension.

Enlarging Tire Factory—D. Lorne McGibbon, president of the Canadian Consolidated Rubber Co., of Montreal, has announced that the company has decided to enlarge the scope of its business by erecting an additional factory for the exclusive manufacture of motor car tires.

Austin Reorganizing—With George H. Davidson and W. R. Shelby interested with James E. and Walter S. Austin, the Austin Automobile Co. of Grand Rapids, Mich., is being reorganized with a capitalization of $500,000. Three hundred thousand dollars will be common stock and $200,000 6 per cent preferred. Stock will be open for popular subscription and a 50 per cent bonus of common may go with the preferred. It is planned to build a new factory.

Republic Will Increase Stock—The directors of the Republic Rubber Co., of Youngstown, O., have authorized the calling of a stockholders' meeting to be held early in August for the purpose of increasing the authorized capital of the company from $4,000,000 to $10,000,000. The capital will consist after the increase of $6,000,000 common and $4,000,000 preferred stock. No definite announcement has been made as to amount of the additional capital to be issued this year. It is understood however, that the steady growth of the company's business will require new capital before another season. The directors also have authorized the construction of a large modern reclaiming plant, which with the completion of the five-story building now under construction will give considerably greater capacity. It has been reported that there will be a common stock dividend of some size, after the increase of capital has been provided; but there has been no definite action taken in regard to the stock dividend.

Engineers Change Jobs—Two engineers, prominent in the motor car field, have made changes for the coming season. Fred Hawes, for several years with the Cadillac, has joined the Everitt forces and will act as consulting engineer under Will Kelly, the chief at that plant. C. S. Young, engineer and designer for the Lozier company, has severed that connection and has joined the forces of the Regal, with the title of assistant general manager to Fred Haines.

Corbin Making Speedometer—The Corbin Screw Corporation, a division of the American Hardware Co., of New Britain, Conn., announces that it will manufacture and market the Corbin-Brown speedometer. The device has heretofore been known as the Brown speedometer, but under the new name will embody a number of improvements. Colonel W. C. Brown, the inventor, will become sales manager of the speedometer department of the Corbin Screw Corporation.

Wants the Land Back—An effort to take back the land and factory occupied by the Clark Motor Car Co. has been started by the Citizens Industrial Asociation, which about 2 years ago turned the land and plant over to the company. The association has brought suit to foreclose a mortgage and for liquidated damages, asking $26,000, on the ground that the company has not complied with an agreement to employ 150 persons for a period of 5 years, beginning 90 days after the company began operations. Involuntary bankruptcy proceedings were brought against the company some time ago and the plant was recently reopened after having been closed since February. The involuntary bankruptcy proceedings were settled.

Carter Corporation Plant Sold—The plant of the Carter Motor Car Corporation, at Hyattsville, Md., was sold at auction last week and was bid in for $12,000 by P. M. Galvin, acting for the Independence Motor Co. It is understood this action was taken to protect the stockholders of the defunct corporation. It is planned to organize a new directorate of the Independence company and resume operations.

Lion Will Stay in Adrian—Directors of the Lion Motor Car Co., which recently lost its plant in Adrian, Mich., by fire, have decided to accept the offer of the city of Adrian of a complete factory building in that city, and will equip it as a motor car plant immediately. This plan will enable the Lion people to fulfill their contracts for orders of parts and supplies already purchased for their 1913 line.

Another Horn Suit—The Aermore Mfg. Co., which last week filed suit in the United States circuit court, at Chicago, against the New Era Mfg. Co., maker of the Trinity Chimes horn, asking for an injunction and damages, has filed in the same court a similar suit against the Big Four Horn Co., of Watseka, Ill., manufacturer of the Big Four horn, asking for an injunction to restrain the manufacture of such horn and claiming an infringement of patent owned by the Aermore Mfg. Co.

Denniston Assets Sold—The hearing in the Denniston company bankruptcy proceedings held at Buffalo last week resulted in the sale of the company's property to Dr. Edward J. Meyer, 1312 Main street, for $9,050. The bankruptcy petition indicates that liabilities amounted to $65,745.94, of which $60,385.38 were unsecured. Its assets were $99,636.27, stock being $5,089.43, machinery $19,219.42, and open accounts $13,727.17. A final hearing in the company's affairs has been set for Wednesday, July 10.

CELEBRATION OF THE HAYNES COMPANY AT ITS PLANT IN KOKOMO, IND. LAST WEEK

Development Briefs

Bridge's Starter for Ford Cars Cranks Motor from Seat by Pull on Chain—Michelin Repair Kit—A New Tire Filler—Boring Cushion Spring Wheel

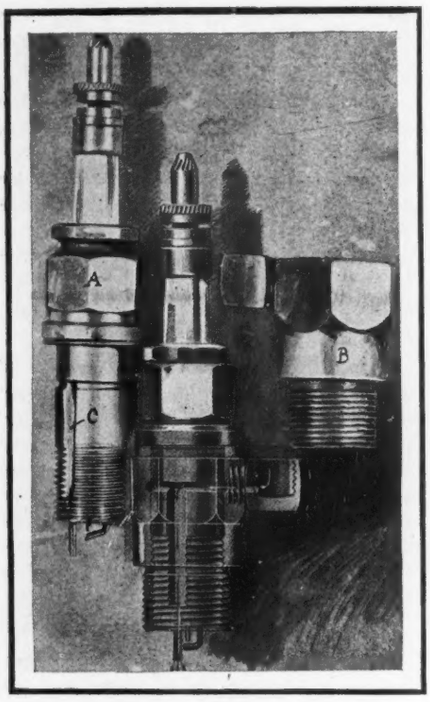


FIG. 1—MACO STARTER SPARK PLUG

Cranks Fords From Seat

AT the remarkably low price of $12, the Bridges starter, is to be put on the market by C. E. Bridges, Chicago. The new appliance is purely mechanical, being operated by a pull on a small handle located on the dash between the seats, see Fig. 7, and may be operated by either occupant. The starter attaches to the front of the radiator, in the place of the usual crank, see Fig. 6, and consists of a segmental metal spider, roughly one-third of a circle, the rim of which is a groove in which a light chain works. This chain is led by a pulley and a metal tube to a clutch on the dash, where it is attached to a handle. A pull on the chain is sufficient to turn the motor past two cylinders, which is twice the usual crank stroke, the segment being returned by means of a spring, hidden behind an ornamental circular brass plate. The device uses the same ratchet as is furnished with the car, employing a safety release that opens in case of back-fire. A primer is included with the outfit, for use in cold weather, and a handle to be attached to an arm of the segment for hand cranking to test compression. A small lock is applied to the chain clutch on the dash to prevent theft of the car. The device is finished in black enamel, except the dash parts, and is claimed to be much easier in action than the crank.

Michelin Repair Kit

Measuring 6 by 3 by 3½ inches, the new Michelin repair box contains almost everything the motorist will need for roadside tire repairs. The kit is contained in a substantial metal box, and contains a 2-ounce can of pure gum cement; an envelope containing six assorted red Para inner tube patches; a blow-out patch; a large piece of emery cloth; a box of talc; and a can of mastic, which is a quick hardening plastic cement for healing cuts in casings, and punctures in tubes. It is more than a cement, being more in the nature of a filler for holes in the tire casings.

New Tire Filler

Chemical rubber is the latest compound to substitute air in pneumatic casings, and is the product of the Chemical Rubber Co., Chicago. The compound is composed of secretly compounded chemicals, and is said to contain no oil, grease, or other matter detrimental to rubber. It is black, and said to be immune to climatic conditions. Unlike most tire fillers now on the market, it is not stuffed into the casing as sausage meat into a sausage casing, but is injected into the tire in the liquid state, and cured by a secret process, making practically a solid tire. It is baked from 7 to 9 hours, at a temperature of from 107 degrees to 135 degrees fahrenheit. Of course this process requires that the tires be sent to the plant, which is located in Milwaukee, Wis.

Boring Cushion Wheel

For the purpose of doing away with pneumatic tires on motor cars, and eliminating body springs on lighter vehicles, Robt. E. Boring of Carlinville, Ill., has patented a spring wheel illustrated in Fig. 4. The wheel consists of two principal members, one, a rigid rim, to which a steel or rubber tire may be applied, attached to a rigid spider, the center of which is an open ring; the other a floating hub, to which is secured twin disks or side-plates, between which the spokes and inner ring of the spider are free to oscillate, any lateral thrust being withstood by the disks or webs, which are rigidly bolted together, the bolts passing between the spokes of the spider. This floating hub is held normally concentric with the rim by means of coiled springs, interspersed between the rigid arms of the spider, and are flexibly attached by telescopic hangers between the rim and the disks. The oscillation of the hub, as induced by loads or impact with inequalities in the road, is cushioned by the springs, and limited by the inner diameter of the central ring of the spider. The suspension of the springs is adjustable to permit of increasing or decreasing their tension, to adapt themselves to varying loads, and conditions of use.

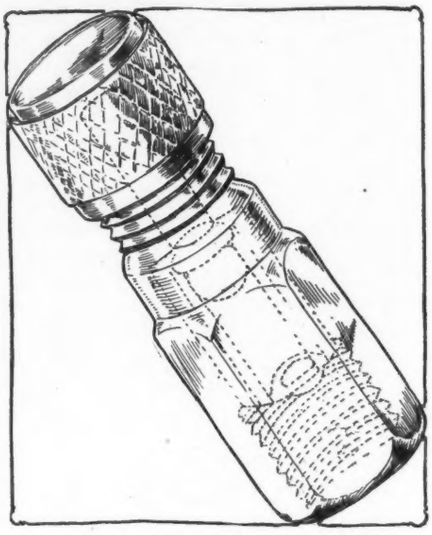


FIG. 3—STEVENS TIRE VALVE

Stevens Tire Valve

Stevens Mfg. and Supply Co., of Chicago, has just announced a new tire valve, differing radically from the type hitherto universal. It is designed to screw on to the old style of valve, by simply removing the cap and core, and screwing on the hexagonal end of the new valve. The new valve, as may be seen in Fig. 3, is extremely simple, consisting of but seven parts, as against eleven of the old type. It has no springs, the action being through a bronze ball, and the valve area is said to be seven times greater than other tire

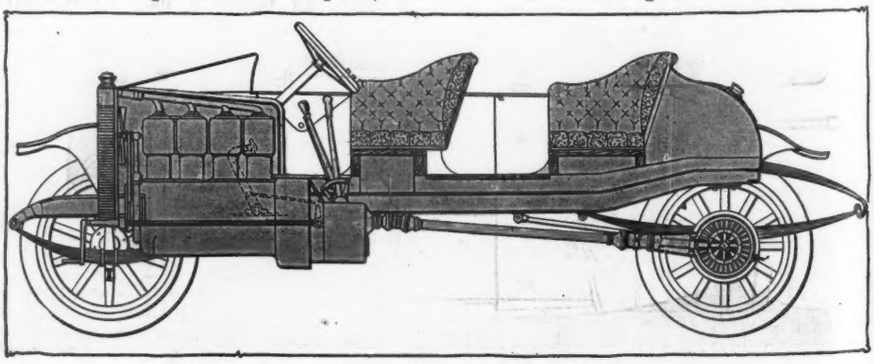


FIG. 2—SIDE VIEW OF HUFFMAN HOODLESS CAR

Novelties for Motoring

Maco Starter Spark Plug Makes Connections for Acetylene Device in Any Engine—Hoodless Motor Car Body Gives More Room With Same Wheelbase

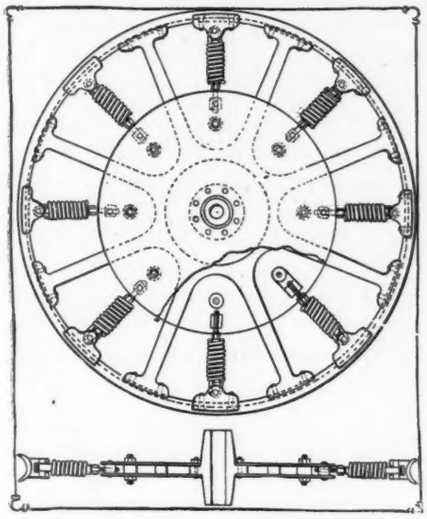


FIG. 4—BORING CUSHION WHEEL

valves. Every motorist knows the great resistance offered by the ordinary valve, even though the tube be empty, while it is claimed that the Stevens exerts no back pressure whatever, other than the actual pressure of the air in the tire. It is constructed of non-rusting metals.

An Apron Overall

Tourists will be interested in a combination of apron and overall for protecting their clothing when working around a car. This is called the Koverette and it is made by the Berlin Fabric Mfg. Co., Berlin, Wis. In construction, the Koverette is an apron while in appearance it is sort of overall. The apron is split down the middle to form the trouser legs which are fastened by a strap at the knee and a snap button at the instep. The garment is said to be grease and waterproof and can be folded up to the size of a newspaper.

Hoodless Motor Car

A hoodless body which carries the seats amidships of the wheels, has been patented recently by C. F. Huffman, of the Colby Motor Car Co., Mason City, Ia. The seats are carried further forward than is possible with the same length of engine and wheelbase with standard construction. The design is similar to designs that are attracting attention in Europe. As may be seen in the Figs. 2 and 5, the additional space is obtained by widening the body forward, allowing a narrowed engine compartment to extend back through the forward floor boards, in a manner similar to the way in which the boiler of a locomotive extends into the cab. A copious cowl covers this and the foot compartments which are situated on either side of the motor. The dash is divided into two halves which are placed above the foot compartments. The radiator is placed in the usual position, and is attached directly to the cowl. This construction affords as much accessibility as with the dash radiator, offering the additional advantage of access to the engine without leaving the seat.

The rear seat should prove a revelation in comfort, because of its position forward of the rear axle, instead of above it, which space affords an ideal location for the fuel tank. This design should prove a safe one, eliminating, as it does, dangerous overhang at the rear. The design as a whole carries out the much desired stream-line effect admirably, and should prove very graceful, as it avoids the usual break in the body lines at the dash.

Maco Starter Plug

For motors not equipped with priming cups, the Maco starter plug, manufactured by the McDonald Appliance Co., Chicago, is a useful accessory to all forms of gas starters. It consists of a well-made spark plug, which sells at the standard price, and which instead of screwing direct into the cylinder itself, is screwed into an adapter, B, in Fig. 1. This adapter is threaded to fit any standard spark-plug tap, and has a small elbow union to which is soldered the gas tube of the starter system and once inserted never requires to be removed. The plug A, which may be purchased separate from the adapter, is standard in every way except, that it is threaded to fit the adapter instead of the cylinder itself, is made slightly longer than standard, to accommodate it to Ford and similar motors; and is especially grooved to provide passage for the gas. These grooves are open and may be cleaned with a knife blade, the upper one extending entirely around the body of the plug, so as to register with the inlet from the union, regardless of the position of the latter in relation to groove C. Groove C is terminated by the injector nozzle, which extends below the spark points. The use of this plug should be beneficial even on motors equipped with priming cocks, because of the fact that it may be readily cleaned without disturbing the starter connections, which is true of no priming cup, this latter fact being a common objection to ignition starters.

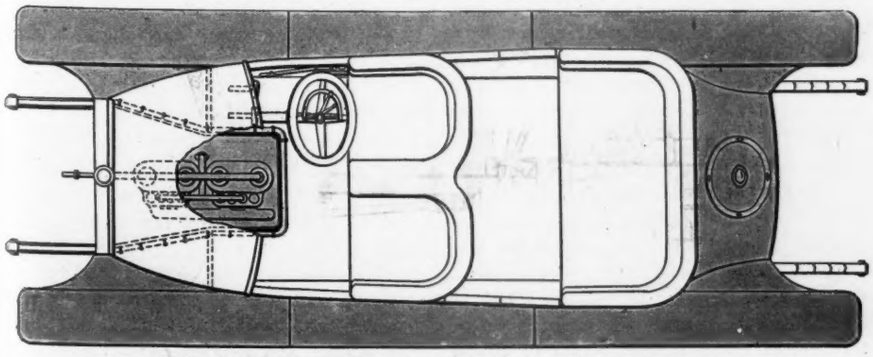


FIG. 5—PLAN VIEW OF HUFFMAN HOODLESS CAR

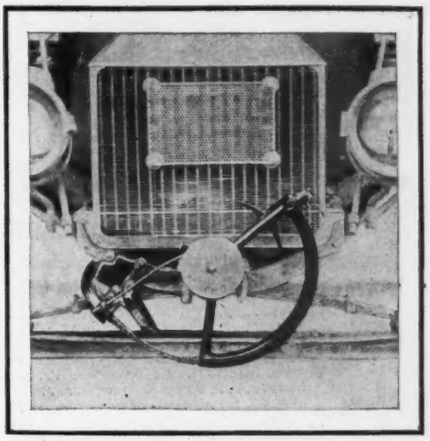


FIG. 6—BRIDGE STARTER ON FORD

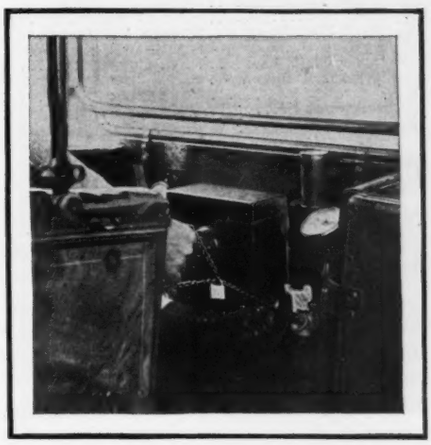


FIG. 7—HANDLE OF BRIDGE STARTER

Rub-On Top Lining Dye

Faded top linings are often a source of embarrassment to motorists but a dye by which the color can be removed has been produced by the Rub-On Varnish Co., Buffalo, N. Y. It is stated that the dye is a fast color and will not run when wet.

Brief Business Announcements

Recent Agencies Appointed by Pleasure Car Manufacturers

Town	Agent	Car
Alexis, Ill.	W. K. McKnight	Henderson
Atlanta, Ga.	Dan Walraven	Henderson
Anderson, S. C.	Fowler's Garage	R-C-H
Allentown, Pa.	Queen City Motor Co.	R-C-H
Battle Creek, Mich.	F. E. Riley	R-C-H
Boston, Mass.	Fred O. Hoyt	Havers
Boston, Mass.	Case Mfg. Co.	Case
Boston, Mass.	James A. Binney	Henderson
Belvidere, Ill.	H. H. Collier	R-C-H
Champaign, Ill.	A. L. Percival	R-C-H
Crosswell, Mich.	Fred A. Moore	R-C-H
Coldwater, Mich.	Coffman & Boucher	R-C-H
Des Moines, Ia.	Interstate Auto Co.	Paige-Detroit
Erie, Pa.	Murphy Brothers	R-C-H
East Liverpool, O.	George W. McNichol	R-C-H
Fergus Falls, Minn	Martin Johnson Auto Co.	R-C-H
Iowa City, Ia.	F. C. Carson	Franklin
Kansas City, Mo.	E. P. Moriarty & Co.	Regal
Laurens, S. C.	Rounds Auto Co.	R-C-H
Mattoon, Ill.	Mattoon Refrigerating Co.	Henderson
Milwaukee, Wis.	Smith-Hoppe Auto Co.	R-C-H
Milwaukee, Wis.	Rohde Automobile Co.	Havers
Milwaukee, Wis.	D. Wittenberg	Cartercar
Mansfield, O.	Myers & Morris	R-C-H
Mankato, Minn.	Mankato Automobile Co.	R-C-H
Morris, Ill.	O. T. Wilson	R-C-H
Niles, O.	Park Auto Sales Co.	R-C-H
Oak Grove, Mo.	W. T. McLaurins	R-C-H
Painesville, O.	Star Garage	R-C-H
Philadelphia, Pa.	Johnson Motor Car Co.	Henderson
Plainfield, N. J.	Service Garage	Henderson
Princeton, Ill.	Evans & Coopins	R-C-H
Roanoke, Ala.	R. L. Allen	R-C-H
Scranton, Pa.	Edward and Howard Conrad	R-C-H
St. Michael, Minn.	H. W. Dick & Son	R-C-H
Washington, D. C.	Storm Motor Car Co.	Hupp-Yeats
Wheeling, W. Va.	R-C-H Motor Co.	R-C-H
Winston, Mo.	W. H. Dice	R-C-H
Woodstown, N. J.	Newton and Reeves	R-C-H

COOPERSVILLE, MICH.—William J. Damoth has opened a repair shop.

Lexington, Ky.—The Bayless Motor Car Co. has changed its name to the Central Motor Car Co.

Anderson, Ind.—The Remy Electric Co. has appointed W. H. Lolley, of London, Eng., as an engineer in the service department.

Ionia, Mich.—The Hayes-Ionia Co. has closed a contract for the construction of four kilns and a machine room addition to its factory.

Cleveland, Ohio—The Park Motor Car Co. has filed notice of an increase in capital stock from $10,000 to $15,000 and a change in name to the Park Motor and Mfg. Co.

Buffalo, N. Y.—George Ostendorf, Franklin dealer, has bought out the interest of H. E. Crosby, formerly associated with him, thus becoming the sole owner of the George Ostendorf Co.

Denver, Colo.—Orin S. Wilson, for 2 years general manager of the Studebaker Colorado Vehicle Co., has been called east to supervise more extensive territory. He has been succeeded by his assistant, J. C. Beck.

Buffalo, N. Y.—The property at 754 Main street, which is occupied by the Pierce-Arrow company's sales department and garage, was sold last week by William H. Hotchkiss to Walter L. Schoellkopf for $250,000. The purchase was made solely as an investment and the Pierce-Arrow company will remain in the building.

Buffalo, N. Y.—A company known as the Auveco, just formed here, is completing arrangements for the opening in Main street of a commercial and pleasure vehicle garage and salesroom. The officers of the new corporation include Otto A. Magelin, Thomas LaVere, Walter W. Miller, W. H. Rodenhouse, James Fox, Forbes Foster, Fred Baker, Frank H. O'Neill, James Moran, W. H. Gentz and Henry G. Walters.

St. Paul, Minn.—The Osborn garage, has been sold by E. W. Bazille to George Benz & Sons, for $30,000.

Kansas City, Mo.—Arrangements are now being made to establish a Marmon branch here. Fred Clinton is in the city looking over sites.

Indianapolis, Ind.—Arthur H. Berndt will become assistant manager of the Indianapolis branch of the Remy Electric Co. on September 1.

Columbus, Ohio—Viola Horn has taken out a permit for the erection of a garage building on Spring street, between High and Third streets, which will be used as a public garage.

Boston, Mass.—John Dalton has been appointed manager of the George Sumner Co.'s branch in this city, agents for the Rayfield carbureter with salesrooms on Boylston street.

Louisville, Ky.—The Everitt Motor Car Co. of Detroit, Mich., has established a branch office in the Coleman building in this city. E. L. Jacoby, formerly manager of the Studebaker branch at Memphis, is in charge.

Kenton, Ohio—The Kenton Gas Engine Co. has added a motor car repair department to its plant. The company will also handle a full line of motor car accessories as well as the Kenton agency for the Knight tires. T. A. Taylor is general manager.

Philadelphia, Pa.—The Chase Motor Sales Co., of Philadelphia, has been organized to take over the agency for this city, and Montgomery county of the Chase line of trucks, under the management of J. A. Rogers. Salesrooms and service station are at the northeast corner of Broad and Wallace street. A service and maintenance station will also be established at Fiftieth and Warrington streets, West Philadelphia.

Columbus, Ohio—The city government of Columbus is taking bids for the erection of a garage for the housing of the motor cars of the city officials.

Anderson, S. C.—The Anderson garage, opened recently, has floor space 95 feet by 60 feet. The garage is located in the center of the city.

Seattle, Wash.—W. A. Wicks, for the past 5 years a member of the engineering staff of the H. H. Franklin Mfg. Co., has resigned to take up the Franklin dealership in Seattle, Wash.

Columbus, Ohio—M. B. Currier, who has been a mechanical expert with the Interstate Auto Co., has been placed in charge of the Columbus agency, which is located at 142 East Gay street.

New Britain, Conn.—The garage on Arch street, conducted by H. B. Freeman, of Hartman, has been sold to Aaron Cohen. The purchase includes the Ford agency here, formerly conducted by Mr. Freeman.

Los Angeles, Cal.—W. Nevin, for several years sales manager of the Pacific Coast Motor Car Co., has resigned from that company and quit the motor car business for the real estate business.

San Francisco, Cal.—T. J. Beaudet, who has earned his reputation as a driver of Cadillac cars on the Pacific highway trip to the City of Mexico, has been made mechanical superintendent of the San Francisco house of Don Lee Co.

Chicago—The Chicago branch and central division offices of the General Motors Truck Co. have been moved from 2201 Wabash avenue to 1811 McCormick building. The three-story building on Wabash avenue is now entirely devoted to the garage and service department. Officials are H. B. Ramey, central division

manager; Ralph Birchard, assistant central division manager, and George Siegmund, Chicago branch manager.

Minneapolis, Minn.—O. W. Klose has been made manager of the United Motor Co., to succeed E. B. Stimson.

Denver, Colo.—The Shaffer Auto Supply Co., of 1240 Broadway, is a new organization which will handle standard accessory and supply accounts.

Greenwich, Conn.—Newton R. Goltra has just opened a garage on Railroad avenue under the name of the Depot Garage and Machine Works.

Washington, D. C.—The garage of the Carpenter Automobile Co., which has been going through bankruptcy, has been purchased by Paul Peck and D. B. Gish.

Albany, N. Y.—John Croissant has completed plans for the construction of a large garage at 203 Washington avenue. The building will be three stories in height.

Winnipeg, Man.—The Darwen Motor Truck Co., which was recently organized to exploit the Commer truck in western Canada, has permanent headquarters in the Imperial garage, Osborne Place.

Winnipeg, Man.—J. M. Ritchie & Co. have taken over the business formerly conducted by A. C. Waters at 62½ Princess street. The firm specializes in producing and repairing sheet metal parts for motor cars.

South Bend, Ind.—The Otis Motor Car Co. has been incorporated here with capital stock of $10,000, the incorporators are N. L. Otis, Gilbert Squires and J. B. Beattie. The company is now located at Main and Division streets and it is announced there will be no change in the method of conducting the garage. The company has the agency for the Kelly, Franklin and Chase trucks, and the Cadillac and Franklin pleasure cars.

Gloucester, Mass.—A large brick garage is being erected on Western avenue for the Perkins & Corliss Co.

West Rutland, Vt.—Richard Mead and Arthur Walker are erecting a garage and repair shop on Clarendon avenue.

Gardiner, Me.—M. M. Spear and W. L. Tozier have taken the lease of the garage building on the causeway opposite the depot, and have opened a general accessory business and storage service there.

Washington, D. C.—The Winton Motor Car Co. has been organized to handle the Winton and has secured temporary offices in the Warder building.

Kansas City, Mo.—The Mercer company, of Trenton, N. J., has established a branch in this city. Roy O. Kendall is the manager at 1524 Grand avenue.

Boston, Mass.—F. W. Richards, who was formerly connected with the local branch of the Premier car, is now sales manager of the agency recently opened here for the Michigan.

Chicago—The Rhineland Machine Works Co. has opened an office and store at 1254 Michigan avenue, which it will occupy together with the American Electric Mfg. Co. D. D. Davis is in charge.

Philadelphia, Pa.—A factory branch of the Peerless line of motor cars and motor trucks, under the firm name of the Peerless Motor Car Co., will soon be opened at 245 and 247 North Broad street, under the management of R. W. Cook, recently sales manager of the Automobile Sales Corp., which formerly handled the Peerless in this territory. Pending completion of the permanent home temporary offices have been established in the Abbott building, Broad and Race streets.

Salt Lake City, Utah—The Alkire-Smith Auto Co., which handles Ford cars for Utah, western Wyoming and southern Idaho has moved to its new quarters at 67 and 69 West Fourth South.

Montreal, Can.—It is stated that a company of American capitalists, associated with Montreal men, has organized a company to commence the manufacture of motor cars here in the near future.

New York—The Baldwin Chain and Mfg. Co., of Worcester, Mass., has established a branch at 416 Broadway. It is in charge of Charles D. Schmidt and will carry a stock of Baldwin chains and sprockets.

Syracuse, N. Y.—George E. Yoa, agent for Abbott-Detroit cars, has opened on South Clinton street a new garage capable of storing 100 cars. The building is of cement and brick with large salesrooms and repair department.

Danbury, Conn.—The Fillow Auto Co. has purchased two lots immediately east of its garage on Crosby street, which will be used temporarily for day storage. Later a new structure devoted to the motor truck business will be erected on the property and joined to the company's present structure.

San Francisco, Cal.—To handle its constantly increasing business in the Pacific coast territory the R-C-H Corporation, through its western sales manager, A. E. Morrison, opened a branch and service station at San Francisco on July 1. The building is a three-story structure on Ellis avenue just off Van Ness, in the heart of the new motor car district, with a floor space

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Recent Incorporations

Akron, O.—Akron Gear and Engineering Co., capital stock, $20,000; to manufacture gears; incorporators, J. R. Triplett, O. E. Prier, T. A. Seacrist, E. T. Dwyer, J. E. Blower.

Barberton, O.—Todd & Courtney Co., capital stock, $10,000; to deal in motor cars; incorporators, J. H. Todd, O. I. Courtney, L. E. Courtney, C. C. Courtney.

Boston, Mass.—Seymour Avenue Garage, capital stock, $25,000; incorporators, C. R. Suibley, J. E. Moulton, E. Jefts.

Brooklyn—Saratoga Auto Co., capital stock, $5,000; incorporators, G. D. Smith, H. A. Bogart, E. J. Bogart.

Buffalo, N. Y.—Automobile Vehicle Corp., capital stock, $20,000; to manufacture motor cars; directors, A. L. Kenyon, F. H. O'Neill, O. A. Hegelm, J. C. Fox.

Chicago—Washington Motor Livery Co., capital stock, $75,000; conduct motor car livery and repair shop; incorporators, C. Leviton, J. Lowenhaupt, S. E. Loeb.

Chicago—Dearborn Automobile Co., capital stock, $10,000; incorporators, S. Oppenheim, A. Rosenthal, J. C. Ahrensfeld.

Cleveland, O.—Auto Owners Co., capital stock, $25,000; to deal in motor cars, accessories, and operate vulcanizing plant; incorporators, P. L. A. Leighley, H. N. Pettibone, W. K. Stanley, F. H. Forrest, J. B. Griesheimer.

Columbus, O.—Federal Auto Accessories Co., capital stock, $2,000; to deal in motor car accessories; incorporators, J. R. Loofburrow, H. M. McDonald, W. C. Wetherhold, E. J. Mace, M. L. Mace.

Columbus, O.—Everitt Auto Sales Co., capital stock, $30,000; to deal in motor cars; incorporators, H. K. Dobson, A. F. White, E. F. McConaha, H. H. Kellenberger, A. W. Daving.

Dover, Del.—Amplex Motor Car Co., capital stock, $1,000,000; to manufacture motor cars and vehicles.

Flatonia, Tex.—Flatonia Automobile Co., capital stock, $5,000; incorporators, C. P. Johnson, D. McKay, F. F. Wotpka, J. W. Snell.

Lima, O.—Gramm-Bernstein Co., capital stock, $500,000; to manufacture and deal in motor trucks; incorporators, B. A. Gramm, Max Bernstein, F. Biezantz, D. Bernstein, H. O. Bentley.

Louisville, Ky.—Punctureless Tire Co., capital stock, $5,000; incorporators, A. T. Murphy, J. H. O'Neill, J. S. Hobson.

Muncie, Ind.—Feeney Hurd Co., capital stock, $20,000; to manufacture universal joint; incorporators, E. J. Feeney, J. H. Leffler, C. E. Hurd, J. D. Miltenberger.

Nashville, Tenn.—Seaton Wheel Co., capital stock, $130,000; to manufacture motor car wheels; incorporators, G. Jackson, S. S. Lord, B. C. Seaton, J. T. Landis, J. R. Boone.

New York—Long Acre Garage, Inc., capital stock, $1,300; incorporators, L. M. Borden, G. Gulbransen, J. F. Taylor.

New York—Amherst Auto Renting Co., capital stock, $5,000; incorporators, P. V. Hoyt, D. J. McAndrews, G. Schippereit.

New York—Rutenber Motor Co., capital stock, $1,350,000; incorporators, N. P. Coffin, W. J. Maloney, H. E. Latter.

New York—Seymour Avenue Garage, capital stock, $25,000; general garage business; incorporators, C. R. Sibley, J. E. Moulton, F. E. Marble.

New York—Standard Auto Burial Co., capital stock, $200,000.

New York—Universal Auto Supply Co., capital stock, $10,000; incorporators, J. J. Treasy, G. F. Connelly, J. R. Hunt.

New York—C. and T. Auto Specialty Co., capital stock, $25,000; motor car trucking business; incorporators, H. G. Waring, H. W. Bell, H. G. Philipps.

New York—Goldfinger Auto Renting Co., capital stock, $2,000; incorporators, B. Goldfinger, W. E. Fisher, I. Wolf.

New York—American Society of Automobile Owners, Inc., capital stock, $10,000; incorporators, R. S. Kennedy, J. C. Murray, A. Woods.

Philadelphia, Pa.—Paxton Motor Car Co., capital stock, $15,000; incorporators, C. H. Paxton, W. A. Kuser, J. S. Vaughan.

Portland, Me.—Edwards Motor Car Co., capital stock, $2,000,000; to manufacture and deal in motor cars; incorporators, E. C. Eaton, T. L. Croteau.

Scituate, Mass.—Egypt Garage and Machine Co., capital stock, $6,500; incorporators, W. E. Chaffin, C. M. Litchfield, C. W. Peare.

South Bend, Ind.—Otis Motor Car Co., capital stock, $10,000; directors, N. L. Otis, J. B. Beattie, G. Squires.

Westfield, N. Y.—Westfield Motor Truck Co., capital stock, $100,000; to deal in motor cars; incorporators, W. F. Mogill, E. L. Hill, H. W. Hallbourg.

Wilmington, Del.—Rutenber Motor Co., capital stock, $1,350,000; to manufacture and deal in generators.

Wilmington, Del.—Keystone Automobile Exchange, capital stock, $100,000; incorporators, J. W. White, C. J. Jacobs, H. W. Davis.

of 18,000 square feet. The San Francisco branch will be used as a car and replacement distributing point for the entire west.

Toledo, O.—The Rassel Motor Car Co., of Toledo, O., has filed papers with the secretary of state decreasing its capital stock from $125,000 to $95,000.

Los Angeles, Cal.—August 1, F. O. Nelson, manager of the local branch of the Diamond Rubber Co., will leave his position after 5 years and will be succeeded by W. J. Voit, at present manager of the branch at Spokane, Wash.

Boston, Mass.—Wilbur F. Talbot, for some years connected with the Boston branch of the B. F. Goodrich Co., died a few days ago after an illness of some months. He came from Barnesville, O., and the body was sent there for interment.

Columbus, Ohio—The firm of John Immel & Sons has completed the erection of a large plant where motor car repairing is now being done in addition to body painting J. E. Jolly, formerly connected with the Packard factory, is foreman of the department.

Toledo, O.—The Ohio Electric Car Co. has taken out a permit for the construction of a three-story addition to its factory on Auburn avenue. The structure will be of brick and concrete and will measure 101 by 61 feet. The building will cost about $15,000.

Columbus, Ohio—The final steps in the merging of the Diamond Rubber Co. with the B. F. Goodrich Co. were taken recently when application was made with the secretary of state for permission to increase the capital stock of the latter corporation from $45,000,000 to $90,000,000.

Salt Lake City, Utah—The Salt Lake Automobile Exchange will handle the Columbia and Maxwell line as its leaders. This firm has in the past dealt entirely in second-hand cars. Plans are published for a new building in which to handle the business. A public garage is to be included.

Columbus, Ohio—R. M. Weaver and W. J. Miller, formerly with the Columbus Machine Co., have purchased the entire capital stock of the Broad-Oak Automobile Co. at 622 Oak street. The purchasers took charge July 1. The concern has the central Ohio agency for the Chalmers and Pierce-Arrow.

Rochester, N. Y.,—The Shafer-Decker Motor Co., capitalized at $50,000, and recently organized, will handle for the next 3 years in this city the Cole. J. W. Jenkins has discontinued the manufacture of pleasure motor vehicles and the entire plant, known as the Jenkins Motor Car Co. will move and make way for the new concern which will locate at 1135 University avenue, this city. The new concern takes over the entire factory and equipment of the Jenkins Motor Car Co., together with its gasoline and oil house and service department in the rear. This will give it 20,000 feet of floor space with room for the storage of 100 cars.

Dayton, Ohio—Gilbert J. Loomis, general sales manager of the Speedwell Motor Car Co. for the past 5 years, has resigned, effective August 1, in order to give his time to the development of a motor car specialty in which he has been interested for some time.

Los Angeles, Cal.—The local branch of the Locomobile Co. of America, which was temporarily located at 942 South Grand avenue, is now occupying new permanent headquarters at Pico and Grand avenues. The new building is considerably larger than the temporary location.

Los Angeles, Cal.—Articles of incorporation have been filed by the Essenkay Sales Co., of California and Arizona, according to L. N. Brunswig, of Los Angeles, who has secured the agency. A local equipping plant will shortly be opened.

Philadelphia, Pa.—The department store has invaded the motor car selling field. The Wanamaker store is now the exclusive Philadelphia distributing agency for the Babcock electric. H. C. Snell is in charge of the Babcock sales department.

Philadelphia, Pa.—A four-story concrete garage to cost between $50,000 and $75,000 is to be erected for the Pullman Taxicab Co., on a lot 73.9 by 86.3 feet at 1534 to 1542 Wood street extending in the rear to include 1529 to 1533 Pearl street.

New York—Glenn A. Tisdale, of the Franklin Motor Car Co., dealer for the Franklin car in the New York city territory, has bought the controlling interest in the firm of John Kerwin Co., which maintained a large Franklin repair shop.

Washington, D. C.—The Motor Truck Co. has been formed to handle Atterbury and Hatfield trucks and Ford delivery wagons. C. Walter Hoover is the sales manager and has secured quarters in the Union Savings Bank building.

Boston, Mass.—The Case is represented in Boston with a branch salesroom, having been opened temporarily at 8 Columbus avenue. The company will later move to the Back Bay when a new salesroom and service station has been completed. George England will take charge of the branch.

Boston, Mass.—Fred O. Hoyt has taken on the agency for the Havers six with headquarters in Boston, but having a large part of New England for his territory. He has a service station at Jamaica Plain, and will shortly open salesrooms in Boston. Mr. Hoyt is the head of the Hoyt Carbureter and Automobile Co.

Lima, Ohio—E. Z. Jefferson, of Pittsburg, visited Lima, Ohio, recently with a proposition to establish a $500,000 tire manufacturing plant in that city in case the local people offer the proper inducement. It is announced that the promoters will furnish 52 per cent of the proposed capital of $500,000 if Lima people subscribe the remainder. It is proposed to give employment to 275 men.

Winnipeg, Man.—Walter Jackson has become western Canada agent for the General Motors Truck Co., of Detroit.

Fitchburg, Mass.—F. B. Higgins has just opened a public garage on Water street and will handle general accessories.

Kansas City, Mo.—W. F. Kneip, for the past 6 years commercial car engineer for the H. H. Franklin Mfg. Co., of Syracuse, N. Y., and E. F. Williams, also associated with the engineering department of the H. H. Franklin Mfg. Co. for about the same period, have resigned to take up the Franklin dealership in Kansas City.

Lima, Ohio—Fred Bizzants has accepted the position of chief engineer and factory manager for the Gramm & Bernstein Co., which will soon open a factory for the manufacture of motor trucks. The plant of the American Strawboard Co. is being remodeled into a factory for the making of motor trucks.

Omaha, Neb.—The W. N. Hellen Motor Car Co. is a new company just organized in Omaha and has the agency for the Firestone-Columbus cars for Nebraska and western Iowa. Mr. Hellen has been in the motor car business in Omaha for some time, previously being engaged in that industry in Kansas City. The garage is at 2416-2418 Farnam street.

Memphis, Tenn.—W. J. Shay has disposed of his interest in the Ozburn Automobile Supply Co. to N. F. Ozburn. Mr. Shay's resignation as vice-president and general manager of the company took effect July 1. Mr. Shay will take up the work of organizing the United States Sales Corporation, with offices in New York, Chicago and San Francisco.

Boston, Mass.—George H. Phelps, who during his year's service as manager of the retail branch salesrooms of the Studebaker Corporation, placed it in second place in the number of sales, has been promoted to manager of the New York branch of the company to succeed Charles F. Redden. Frank X. Coveney has been made manager of the Boston retail branch.

Bridgeport, Conn.—The Locomobile Co. of America has commenced work on the new building which is to be used for the construction of its commercial vehicles. The new building should be completed within the next 60 days, and until that time the company reports trucks will be constructed in the regular departments of the factory.

Providence, R. I.—The Foss-Hughes Automobile Co., which has the agency for the Pierce-Arrow car for Rhode Island, Philadelphia and other cities, has just purchased 35,000 square feet of land located at the corner of Wesleyan avenue and Plenty street, for the purpose of erecting a modern brick salesroom and service depot. The property was assessed for $29,380.